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CATALOGUE-MEMOIR

OF A

COLLECTION OF FORESTAL PRODUCTIONS

EXHIBITED BY THE

General Inspection of Woods and Forests

OF THE PHILIPPINE ISLANDS

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PART. I.

MEMOIR.

Chapter I.

PHYSICAL DESCRIPTION.

The Philippine Archipelago, named by Magallanes the Archipelago of San Lazaro, is situated between the islands of Formosa and Borneo.

The data assigned to its situation by different authors somewhat varies. Accepting those of Padre Buzeta it extends between 5° 9' and 21° 03' of North Latitude, and 120° 37' of East Longitude, meridian of Madrid, but it ought to be taken in consideration, that between these extensive limits, several Islands are comprised, on which the Spanish dominion has not as yet acquired a firm footing.

The total number of Islands that compose this extensive Archipelago, are not less than 1200, and this number could certainly be much increased by including Islets, atolls and madreporic reefs, and to determine them is almost impossible. Therefore confining ourselves to those which are of more importance, we will reduce the enumeration to the following: Luzon. Mindanao, Palawan or Paragua, Samar, Panay, Mindoro, Leyte, Negros, Cebu, Masbate, Bohol, Catanduanes, Marinduque, Tablas, Polillo, Burias and Ticao, all of them of great forestal importance, although it can be said that in these seas, there is not a single Islet, let it be as insignificant as it may, which could not show a splendid crown of exuberant vegetation.

LUZON.

This is the mot northerly of all the Islands in the Archipelago excepting the Batanes which by themselves constitute a province, and the small group formed by the Babuyanes added to the province of Cagayan. Luzon occupies the first place with regard to its superficial importance. Its area is computed at 108,283 square kilometers (1). It is situated between 12° 10' and 18° 43' of North latitude, and 123° 22" and 127° 53' 30"' of East longitude.

Decreasing gradually in width as it advances from North to South, it takes a southeastern direction towards the parallel of 14°, preserving it without any interruption to the straits of San Bernardino, which separates Luzon from the Visayas. The eastern coast is washed by the Pacific Ocean, the Northern and Western coasts, by the China Sea, and the Southern, by that of Mindoro.

The Lagsig and Cabalisian mountains, lying the first between 124° 86' E. longitude and 16° 5' N. latitude, and the second between 124° 29' E. longitude, and 16° 8' N. latitude, may be considered as the principal nucleus of the orographical system of Luzon. From it begins a range of mountains which is the most elevated in the island, it takes a northerly direction and with slight inflections towards E. and W. and ends on Patopatpoint. The width of this range, which takes the name of Central Caraballo in the first two thirds of its length and that of North Caraballo in the last third is about fifteen leagues from the Christian villages of Pangasinan, Abra, and Ilocos to those of Nueva Vizcaya, Isabela and Cagayan.

This space is inhabited by numerous tribes of Igorrotes, some of them pacific and occupied in the cultivation of the level lands sometimes to be met with between the rugged mountains, and others, still ferocious whose sole ocupations are war and hunting. Mount Data situated in the mining district of Mancayan, is perhaps the most elevated peak in the range. From the central axis of the same depart several ramifications descending on both its the highest of which are those that close on the western side of the hollow formed by the Abra, and that of Agno grande. The mountain of Tongló which rises opposite to the villages of Agóo and Santo Thomas is the most conspicuous in Luzon.

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(1) This datum, and those analogous to it, have been deduced from Coello's maps.

Other ranges depart from the main nucleus of the Caraballos. One of them is that, which, departing in a North East direction and running parallel to the eastern coast, is known by the name of *Sierra Madre* and ends in Cape Engaño. The thick woods that clothed it and which have not yet been explored, are inhabited by several infidel and savage races of various habits and physical characters. There is no reliable fact regarding the height of the summits on this boundary line, which limits on the eastern side, the bed of the Rio Grande in Cagayan. The second range is that which going towards the South, separates the provinces of Nueva Ecija and La Laguna from the districts of the Principe and Infanta traverses the provinces of Tayabas, Camarines and Albay, forming the boundary between the Pacific Ocean and Mindoro Sea, and ending near San Bernardino Strait in the volcano of Bulusan. The Sungay and Maquiling mountains which run from E to W. through the southern part of the extensive lake of Bay unite with the former range in the volcano of Banajao near Lucban. The most elevated peaks on this last chain of mountains are about 7000 feet above the level of the sea. The Zambales mountains are independent from the last metionned and extend from the Gulf of Lingayen to the Bay of Manila: they constitute the eastern limit of Zambales and the axis of Bataan where they take the name of Mariveles.

The extensive territory comprised between the Caraballos and the Pacific Ocean is divided into three provinces, Nueva Vizcaya, Isabela and Cagayan. It is traversed from N. to S. by the Rio Grande, the total length of which is about 60 leagues from its source to its mouth. Owing to this circumstance and to its great amount of water, it is the most important river in Luzon and perhaps in the whole Archipelago; but navigation, only possible in the last third of its course, becomes dangerous in the rainy season on account of the large trees and stones carried down by its waters. The affluents of Rio Grande are numerous, and some of them considerable.

The river Abra takes its origen on the lofty ridges of the Caraballo, in Mancayan, and runs from S. to N. somewhat inclining to the N. W. and in the neighborhood of Jayum, it describes a curve towards the S. W. It carries a considerable amount of water from the great number of affluents which pour down their water from the mountains which limit its natural bed. The total length of its course is from 25 to 30 leagues.

The Agno Grande begins at a short distance to the S. E. of the source of the Abra and on the western declivities of Central Caraballo. Running from N. to S. and increasing the volume of its waters by those of many affluents It enters the province of Pangasinan near Villasis and following that direction, it turns to the West, then to

the N. W, and pours its waters in the Gulf of Lingayen. The River called the Rio Chico de la Pampanga owes its origen to the lake of Canarem and directs its course to the south receiving several affluents, and especially on its left bank. One of these is the Rio Grande de Nueva Ecija which comes from the N. E. and after receiving the rivers of Pantabangan, Coronel and Gapan incorporates itself with the Rio Chico near Arayat continuing to the South till it ends into Manila Bay. In this manner, the Rio Grande de la Pampanga becomes the receptacle of all the waters which come down from the mountains that encircle the province of Nueva Ecija on the North and East, as also from those that from the eastern limit of that of Bulacan, as the river of Angat or Baliuag which takes its origen from those mountains, unites with the Rio Grande near Calumpit.

It would be endless to enumerate the rivers of second or third class, affluents or not to those already mentioned. Through every ravine descend the waters flowing from the neighboring hills running either towards other principal rivers, or directly to the sea. The distances from their respective sources to their mouths, are not generally great in this last case, because the mountains do not commonly rise far from the coast, but notwithstanding the want of length many of these rivers acquire considerable proportions, because when they emerge into the plains they become wider and divide therselves into many branches: hence communications are notably difficult, and especially during the rainy season. The Pasig and the Vicol or Naga rivers, are the only ones which deserve special mention. The first is that which drains the extensiue lake Bay of and debouches into Manila Bay near the Capital of the Archipelago: and the second which takes its origen in the southern extremity of the province of South Camarines directs its course towards the N. W. receiving several affluents, reaches the lake of Bato from whence it emerges and following the same direction, receives a little to the N. the river Buhi which issues from the lake of the same name, increases afterwards its waters with the drainage of lake Baao and flowing through the centre of a most fertile level land, it falls into the Pacific Ocean in the Bay of San Miguel.

Two seasons are known in the Philippines: one dry and the other wet. (1) The S. W. monsoon carries rain-water into the open country at the access of the S. W. winds, and during the months corresponding to summer in Europe. The quantity of rain-water that

(1) These imformations about the climate are taken from Jagor's work "Reisen in den Philippinen," translated into Spanish by Don Sebastian Vidal y Soler Forestal Engineer.

falls on the northern and eastern coasts, is, on the contrary, greater in the winter months when the N. E. monsoon prevails. The orographical configuration of the land, modifies these general circumstances in a quite different way. The dry temperature lasts in Manila from November to June (N. E. monsoon) and the rainy in the remaining months, (S. W. monsoon) the maximum, attained by the rains, happens in September; March and April are sometimes free from them; in October until February inclusive the weather is cool and dry, (prevailing winds N. W., N. and N. E.), in March, April and May warm and dry (E. N. E. and E. S. E.), from June to the end of September damp and moderately warm.

Some years since a meteorological observatory was established in Manila under the direction of the Jesuite fathers The following facts are taken from the annual report emited by Profesor Dove of Berlin.

Barometer. The average height of the mercurial column was in 1867 of 755.5 millimetres (1865: 754.57 millimetres, 1866: 753.37 millimetres.)

1867. The difference between the barometrical extremes did not go beyond 13,-96, millemetres, and they would be less still without the abnormal depressions caused by storms in July and September; the hourly oscilations were only of a few millimetres.

Daily range of the barometer. It ascends from the first morning hours to about nine o'clock A. M, descends afterwards till three or four o'clock P. M, ascends again till nine o'clock P. M. from which hour it commences its descension untill morning. Tho two principal atmospherical currents, exercise a remarkable influence on the range of the barometer; the northern one gives motive to its ascension (normal height, 756 millimetres) and the southern one to its descension (normal height 753 millimetres.)

Temperature. Heat increases from January to the end of May, and afterwards decreases to December. Middle annual temperature 27° 90 C. (0,4 over the former years.) The maximum height observed was 37° 90 (15th April at 3 o'clock PM) and the minimum 19° 04' (14th December and 30th January at 6 o'clock AM) Difference 18° 03'. Importance of thermometrical oscillations January, 13° 09', February 14° 02', March 15° 00', May 11° 01., June 9° 09' July 9° 00', August 9° 00', September 10° 00', October 11° 09', November 11° 08, December 11° 07. Coldest months: November, December and January, northerly winds. Warmest months: April and May. The elevated temperature of the air gives motive to the change of the N. E. monsoon into that of the S. W. The nearest temperature to the normal one is that, which is experienced

from June to September, the oscillations are the least on account of the almost continual rains and cloudy weather.—The minimum oscillations are those observed from Six to Seven AM, and the maximum from two to three in the afternoon from which hour the thermometre commences its downwards movements. During some hours in the night, it remains almost invariable; towards the morning it suffers a rapid descension.

THE DIRECTION OF THE WINDS. The monsoons as a rule are constant but they are subject to local influence. In January and February north winds prevail, and southeast ones in March and April. In May, June, July, Agust and September, the reigning winds are from the southwest. In the beginning of October variable winds are experienced from S. E. to S. W., and at the end of the month their direction become fixed at about N. E. The two changes of the monsoons occur in April or May, and in October.

The skies are commonly partially overcast and cloudless days are rare except from January to April (N. E. monsoon.)

RAINY DAYS: were 168 in the year. The most frequent and copious rains were at their heaviest from June to the end of October. In September alone the rain fall was 1.m 05, or about three times that of Berlin for the whole year.

AVERAGE DAILY EVAPORATION. Was about 6. 3.m One year with another there is little difference.

CYCLONS. Baguios or Typhoons often occur on the change of monsoon. The velocity of the wind has reached 37 to 38 metres per second.

A SUMARY OF METEOROLOGICAL OBSERVATIONS MADE IN MANILA, DURING THE YEAR 1867.

Atmospherical Pression.	Middle.....	775. 50 milimetres.
	Maximum	760. 75 (December 13th.)
	Minimum	746. 77 (September 24th.)
	Difference.....	13. 96.

Air's temperature.....	Middle	27. 9. C.
	Maximum	37.° 7 (April 15th.)
	Minimum	19.° 4 (Dec. and Jan. 30st.)
	Difference	18.° 3
Air's humidity.....	Middle.....	63. 93°/o
	Maximum	97. 81°/o (August 21st.)
	Minimum	22. 12°/o (May 16th.)
	Max: difference..	75. 69°/o

Quantity of rain.....	3078.8 m. m.
Rainy days.....	168
Average evaporation in 24 hours.....	6.3 m. m.
Total evaporation.....	2307.3 m. m.
Cloudless days.....	49
Partially overcast., ...	144
Overcast.....	172
N. E. winds velocity per minute.....	554 metres.
S. E. »	561 »
S. W. »	512 »
N. W. »	453 »

THE MEDIUM VELOCITY OF THE WIND PER SECOND.

N. E.....	2,1 metre.
S. E	3,1 »
S. W.....	3,6 »
N. W.....	2,3 »

A Baguio which took place on ths 27th of September, occasioned great damages and 17 vessels were drawing on shore an stranded.

The existent facts concerning the geological constitution of the Philippine Islands are incomplete and limited. Profesor J. Roth compiling the private indications and observations made by Chamisso, Hoffman, Meyen, Sainz de Baranda, Chevalier and Dana, has put an appendix to Jagor's work «Reisen in den Philippinen» in which he imbodies all the facts concerning that particular. From that work we have extracted the following.

Upon masses of crystalline slates, rest modern deposits of tertiary (Eocene) formation undoubtly some of them, even more recent, coral banks and reefs arised up by species of molusca identical to those other formations are of now growing in the Pacific Ocean.

The existence of various active volcanoes, of others completely extinct, and some that remain in a transitory state of solfatara, induces to suppose that there is no want of cruptive modern rocks,

even if it can not be clearly deduced from the specimen gathered and the existent facts. The active volcanes in Luzon are the "Cagua" which measures 2489 feet above the sea and was discovered by Don Claudio Montero, that of Taal which scarcely measurs 840 feet in height and is situated on a little island of scoria on the Bombon lake, and is in conection with the Binatiang Grande and Chico, which are extinguished volcanoes, that rise in the same island forming themselves into a mountain composed of á dark grayish mass of a fine brittle texture with little feldspathic crystals, which may probably belong to the dolorites; the Albay or Mayon of 7,600 feet above the sea, and the Bulusan situated on the Southern extremity of San Bernardino Straits. Extinguished volcanoes are more numerous. The series of those which exist in Luzon commences in mount Pocdol near Bocon betwen the Bulusan and the Mayon, its direction follows through the Masaraga situated to the N. W. of Albay, the Malinao or Buhi, and the Iriga to the North of the former, the Isarog on the same direction, the Labo and the peak of Colasi in the province of Camarines Norte, the Majayjay or Banajao to the south of the Lake of Bay, the Sosong-cambing and the Malarayat the most meridional, and finally the Maquiling remarkable for its abundant solfataras. It is doubtful, if the Arayat which stands in the middle of Pampanga's plains to the N. W. of Manila and rises to 3150 feet above the level of the sea, mount Datá near Mancayan (to the N. W. of Luzon), and Subic on the Zambales mountains, are to be considered as extinguished volcanoes. In the Philippine Islands as in every other part of wold, active and extinct volcanoes are iu connection with tophus formations. They are of an ashy-green colour and compact enough to be employed as building materials. In many p'aces on the banks of the Pasig, towards the lake of Bay, deposits are formed from 40 to 60 feet thick. According to Rose, they consist of a gray rough friable mass which conceals angular fragments of pumicestone of a bluish-gray colour. Dana says that they contain impressions of leaves and silicated woods generally of the Palm kinds identical to the species of the actual flora. At the neighborhood of actives volcanoes there are loose volcanic sands, and in those which are extinguished, they are formed in masses of a more or less solid formation, which are deposited in a disorderly manner, mingled with the subjacent rocks, or with calcareous formations on the coast, which being the produce of marine moluscs can be used as cement. The grain, size and number of the incrusted fragments are extremely variable.

Volcanic formations, are however subordinated in the Philippine Island to crystalline slates, and to sediments. Amongst the first, are observed the gneiss, micaceous slate, hornblende, hornblendic,

gneiss, talcous and chloritic slates and the serpentine. Hornblendice slates of a fine grain resting on calcareous beds, are observed at San Mateo and Montalban (Manila Province). The washing places where gold is separated from sand on the valley of Agno Grande River in the Igorrotes country, as also the iron ore of Angat indicate likewise the presence of crystalline slates, and according to Chevalier in the province of Bataan on the western side of Manila Bay, serpentine are also to be found. The N. E. coast of the province of Camarines Norte betwen Paracali, Manbulao and Longos, is formed of gneiss and the corresponding hornblendic and talcous slates, and serpentines which reach as far as Indang and Labo, and they continue probably to Caramuan ridge situated on the other side of the Bay of San Miguel. On the south coast of the same province near Pasacao, hornblendic gneiss and slates, make their appearance.

Sedimentary deposits are formed from the descomposition of crystalline slates. Different minerals of primitive rocks are recognised in them, such as quartz, feldspath, mica, and magnetic iron. These deposits, are more or less siliceous and clayey and its petrographical character fluctuates between clayish and sandy deposits.

Under the sediments, appear calcareous and sandy deposits and layers of clay produced partly, as it has already been stated, by the decomposition of Crystaline slates, and partly by volcanic tophus. Upheaved madreporal banks are turned into hard compact limestone. In some of these, coral prints are discovered though badly preserved. Near Binangonan (to the North of la Laguna de Bay) Richthofen found in the limestone rooks there a fragmentary form, many numulites mingled with oysters in a bad state of preservation. In the limestones of San Mateo, Meyen searched in vain for fosils. Richthofen saw in those two places the same limestone as that of Antipolo and Bosoboso forming a mountain with steep sides much forrowed, and with a level plain summit as a kind of mill-stone.

The abrupt summits on the range of Zambales are probably of the same formation. Four leagues from Sual, Callery saw a belt of rough limestone and travertine which was two leagues in width resting horizontally on the euphotid-rocks. He found also in the limestone decapod crustaceous: Portunos leucodon, Desmarest, and the Noptacus Latreillei. Semper has seen in the valley of Benguet and in the province of Batangas coral limestones. He gathered himself to the west of the grand ridge of Luzon at a height of 800 feet above the level of the sea, sands containing marine moluscs, and in Agnos valley ot a height of 400 feet, corals and porphyrical rocks the principal component of which, were granitical round pebbles and trachytes. Such is summarily, what is deduced from the limited geognostical studies made until now in this country.

The richness and variety of vegetation in the Philippine Islands are beyond all encomium. Part of its soil under cultivation being relatively very small; immense forests, the height of which astonish on account ot the giantlike proportions of their trees and for the diversity of their botanical species, overrun still a great extent of ground in the interior even of Luzon and on the eastern coast. Laying a side the vegetable productions which appertain to the agricultural dominion, it can be affirmed that in the Flora by Padre Blanco a twentieth part of the plants of many the country are scarcely mentioned. When one penetrates for the first time into some of these forests, the mind loses itself in the spectacle presented by those vegetable giants, measuring two and three metres in diameter, the tops of which form an immense vault of verdure. The soil, endowed with an amazing fertility, favors every where the developement of plants, so thick and abundant, that only with the axe's help it is sometimes possible to open a passage amongst them. Their trunks clothed with innumerable parasitical plants are concealed under a green covering, and colossal creepers climbing up entwine them forming beatiful garlands amongst which armies of monkies gambol with amazing agility. When the winds stir with silent murmuring those vaults of verdure and the creaking noise of colossal bamboos, mingles in wild concert with the hoarse croaking of the Calao, which build its nest on lofty tops of the trees, then the man felt his own insignificance before the surounding greatness of nature and as if fearful of having surprised its secrets an unsurmountable impulse springs up in him to abandon such gloomy places.

The properties and aplications of a great portion of forestal species, are pointed out in the second part of this memoir. The *molave* and the *banabá* which resist in an extraordinary manner the destructive action of the waters, the *mangachapuy*, *guijo*, *pasac* and *yacal* for house building, the *narra*, *ebano*, *camagon*, *malatapay*, *alintatao* and *tindalo* for cabinet work, the *betis*, *dongon*, *palomaria* for naval construction, constitue an inmmease wealth, which if turned to account could produce large benefits not only to the Estate, but also to enterprising speculators.

The botanical species corresponding to certain grups peculiar and characteristic to intertropical countries, are substituted in the most elevated regions on the septentrional zone of Luzon, by other congeners to those which constitüe the asiatic, european and american floras. In the highest part of the range of Zambales the *tapulao*. (Pinus Merkusi, Y. et W.) forme into groups, and even considerable forest. The high boundary line formed by the Caraballos from the district of Benguet to Ilocos Norte, is clothed by the saleng (Pinus insularis, Endl), which descends sufficiently down through the declivities of Abra. Amongst these masses formed by pine trees, are to be

found immense groups of oaks, and even the mountains of Angat are besprinkled with different species of the same genus.

The traveller who ascends the mountains inhabited by the Igorrotes and where they have established their hamlets, fancies himself transported to some European regions, not only for the climate, but also for the peculiar character of the ground and the uniformity in the masses formed by the trees; such is the character which the height above the sea impresses to vegetation.

But even in the lowest regions there are extensive surfaces devoid of woodland, and barren grounds covered by the *cogon*, or the various species belonging to the grasses, sedges and juncaceous plants. These grounds covered by the *cogon*, are sometimes used for pasturage. The banks and mouths of the rivers are festooned by thick mangroves (Various species of Rizophora, Sonneratia Pagatpat etc.) that narrow their beds and hive shelter to numerous crocodils.

Perhaps the Island of Luzon, is the one which offer the greatest varieties in its vegetable productions on account of its latitude and the great elevation of its principal mountains.

MINDANAO.

To Mindanao Island belongs the second place in the successive order, and perhaps the first with regard to its exuberant forestal wealth. It measures a surface which contains 84.730 square kilometres, being situated between 5° 31' and 9° 49' 30" of North latitude, and 125° 30' and 129° 44' of East longitude always measured from the meridian of Madrid.

The Spanish dominion in this Island, is only a fact in some of the localities on the coast, and the extent of land occupied by the Spanish Government, do not go beyond two eight of its total surface.

The cristian towns or establishments are subjected to the frequent assaults of the moors from the neighbouring archipelago of Joló or Sooloo, and they sometimes extent their depredations as far as Visayas.

Under such conditions it is to be supposed, that studies relative to the inland countries of Mindanao can not be too far advanced. Three principal ranges of mountains rise in the Island. One is that which runs from N. to S. from Surigao to Cape San Agustin and presents its most important nucleus near Bangalunga, where it bifurcate sending from that point a great ramification which prolongs itself in direction to the west. Another range runs almost parallel to the former from point Divata on the western side of the Gulf, of

Butuan to the Bay of Sarangani near the Cape of the same name, which is the most southern point in the Islan l. Mount Apo constitues its greatets height, the ramifications its form the steep range of Blik. The third range almost perpendicular to the former ones, springs from the second in the neighborhood of Tagaclogon and follows direct'y to the W. It rises in a remarkable manner and form the peaks of Randaya, situated on Misamis isthmus, and from there, it civides into several branches increasing in height as they approach the coast, and amongst them, the most important is that which following a northwestern direction, ends in point Maralay or Davait, where it submerges into the sea; and the one which prolonging itself through the center of the land belt in a northwestern direction the gulf of Sibuguey and its last bultresses reaches till near Zamboanga, on the place where formerly stood Fort Caldera.

The largest rivers, are the Pulangui or Rio Grande, and the Agusan or Butuan river. The first springs from the chain of Apo and dies away to the westvard of Illana Bay. Its steam might be divided into four regions: the Upper, which is comprised between its origin till it arrives a little above Matingcahuan and is still unknown; the Middle from Matincahuan to Cabasalan Island or Santa Isabel, measures about 92,50 kilometres; the Lower from this last point to Fort Tumbao, the lenght of which is of 40,70 kilometres; and the Maritime, from Fort Tumbao to ito mouth, measuring a distance of 29,60 kilometres. Agusan or Butu n river has its source according to P. Buzeta in Linao lake from the N. W. of which it emerges, and with various inflections directs its course to the N. receiving several afluents down to Butuan village, where it divides itself in two arms and empities its waters through a double mouth on the bar of its own name. The lenght of this stream is about 80 leagues, being navigable from the entrance to a great distance upwards.

Of less magnitude than the former rivers are the Ilagan which runs over the space that intervenes between Manalas lake and the village after which it has been named, and the Lubungan which ends near of Dapitan wh re it arrives from the S. W. It seems that the reports about the existence of a great lake in the center of the Island, such as it is represented in almost all maps published to the present day, ought to be repulsed as inaccurate. The most extensive lakes known, are the Malanao and Sampangan on the northern ha f of the Is'and, and the Liguasan and Butuan on the plain where the river Pulangui has its course.

The climate of Mindanao is generally milder than that of Manila. Humidity is excesive, and rain waters considerable. Linao, Doctor Semper says, is situated on the Oriental part of Mindanao, on a broad valley open to the N. W. and shettered from the East by a

range of mountains with peaks that reach from 2000 to 3000 feet in height above the sea, and notwithstanding this orographical configuration, winter is also the rainy season and it is because the N. E. winds, which are the cause of it, penetrate through the narrow straits of Surigao and through the channels between Leyte, Bohol and Cebú, entering into the country of the Manobos on the N. W. or N. N. W. part of it. According to the different directions taken by the affluents of the Agusan. some of them coming from the S. W. and others from N. and N. W. freshets caused by the rains are experienced in different ways. In visiting these countries in August and September 1864, when the S. W. monsoon already touched to its termination, the waters in all the tributary rivers on the southern part, attained a very high level, and in thos› on the eastern and in the Agusan itself a lower one. According to the observations made at Linao by Padre Juan Ruiz during a whole year, rain-water fell in 1865 to the amount of 826 Lines in the spring, 265 in winter, 302 in autumn. Therefore, the dry season corresponds there comparatively to summer, however, the quantity of rain during this dry period, is greater than the maximum attained at Bohol, and more than one half of that which had fallen in Manila during the summer. Zamboanga—situated on the western side of the southern coast of Mindanao at 6° 50' of N. latitude—approaches, with regard to the distribution of rains, to what is sometimes observed in the equatorial zone of prevailing calms, notwithstanding being placed on a plain protected against the N. E. winds, and exposed to those from the S. W. In both of them, the number of rainy day are almost the same.

From November to March N. E. winds predominate and S. W. from June to September. In the changes of the monsoons, strong Ty-foongs or baguios occur, particularly on the northwestern part of the Island; they are seldom however felt on the southern coast.

The predominating rocks in the geological constitution of Mindanao are modern eruptives, being visible on the surface of the soil at every step the fearful marks left by volcanoes, and the Macaturin, situated about 8 leagues N. of Pollock, seems to be at present their principal focus. The district, of Cottabato is the only one which has been the object of a brief geognostical exploration. (1) The land is distinguished here into four principal groups, which are the volcanic region, that of modern maritime limestone, that of

(I) Memoir on Mindanao written by the Committee appointed in January 30th. 1871 and composed of D. Luis Golfin Governor of Mindanao, D. José Espinosa Chief physician D. Pedro Martinez Chief M. E. D. José Centeno Chief Mining Engineer, D. Genaro Palacios Chief Road Engineer, and Don Sebastian Vidal, Chief Forestal Engineer.

sedimentary rocks of indeterminate formation, and that of recent alluvions.

The volcanic region, comprises Sugut and the range of Apo. In the buttresses of the first, are found trachytical and phonolitical rocks, the produce of ancient volcanos, anterior to the present epoch, and perhaps to the postpliocenical period. The difficulty met with in explorations has prevented until now the ascertaining of the existing relation between the above mentioned rocks, and those proceeding from the focus of volcanic activity, which exists in the forests of Sugut. Nevertheless, it appears that in the lower region, exist clear indications that the eruptions of Macaturin, become less frequent and intense every day. The volcanic region embraces also the range which separates the districts of Cottabato and Davao in them, according to reliable reports, there are volcanoes that in the present epoch have been and probably continue to be in activity, as is attested by the presence of sulphurous grounds, lava, scoria, and pumice stone.

The region of modern maritime limestone extend on the side of Timaco and Cottabato, and presents clear indications of a gradual and slow upheaval, confirmed by coral remains, marine shells, and perrinkles, which are found undeteriorated incrusted in all its layers This same upheaval ought to have contributed to the formation of Rio Grande's delta giving likelihood to the hipothesis, that, in a recent geological period, the sea filled up the whole space which now occupies the above mentioned delta, forming an extensive gulf in which rose like madreporic promontories, the actual hills of Timaco, Cottabato and Pollock, while Bongod Island of identical formation was scarcely raised above the sea.

The buttresses of the ranges, which start from Cogonal Peak, are formed of limestone and sand; no fossils have higtherto been found in them, and neither it has been possible to study the direction followed by their layers on acount of the vegetation covering the declivities.

Recent alluvions are accumulated, formed of mud sand and round pebbles, which rivers deposit on their banks and mouths.

The appearance of Mindanao, is, as Mr. Lagrene has said, wilder than that of the other islands in the Archipelago. Sir John Bowring remarked in 1859, that there is much fertile land without cultivation. It is said that teak is plentifully found in the woods near the villages on the coast. Indeed, there exist boundless forests, the richness of which, is beyond all comparison on account of the variety and remarkable qualities of its timbers, with the circumstance that, not having yet been turned into account in an extensive way, there are countless localities where the wood land reaches to the very sea coast and the banks of large rivers which afford facilities for exporting timbers easily nad economically. However, it is not possible to give in this memoir

any accurate details with regard to that superb vegetation. The bed of Rio Grande is the only one, which has been the object of a scientific exploration under a forestal point of view carried out by D. Sebastian Vidal forestal Engineer, and even this was necessarily performed in an imperfect manner for want of adequate means of preserving collected specimens. According to said Engineer (1) the principal woods on the bed of Rio Grande, are those of Cabacungan, Cabalucan, Cudarang, Nuling, Taviran, Tamontaca and Timaco. The *guiso* or *guijo* (Dipterocarpus Guiso Bl) predominates in many of them and abound in others, their tall and well shaped trunks and the form of their foliage, in a word, their general aspect remind one of those elm trees, which thrive in damp places near rivers. In all the forests above mentioned the developement of trees is excellent and there are colossal trunks completely healthy, The *molave* (Vitex geniculata Bl) without being so abundant as the guijo, is nevertheless frequent, and of it two varieties are distinguished in relation principally with the good or bad conditions of their timber for building; the first is called *bató*, which signifies hard, and the second *àso*. The *narra* (Pterocarpus santalinus L) much esteemed for Cabinet work thrives also in abundance in most of them, being of good quality even when it does not generally show that bright red color which give it more value. The *ipil*, (Eperua decandra Bl) which is applied to many purposes grows also in those mountains, and it is one of the most valuable timber in the Archipelago, as is also the *malatumbaga* (Crudia spicata D. C.) as well as others no less esteemed, as the *camagon* (Diospyros sp,) the *palomaria* (Callophyllum inophyllum D. C.) the *lauan*, the *manga-inoro* and many others.

In the woods of others districts in Mindanao the former species are likewise abundant, as well as several others of great value for building and industrial applications.

PALAWAN or LA PARAGUA.

Palawan island forms a part of the Calamianes group, which constitute a province and are situated between 7° 14' and 12° 28' of N. latitude and 122° 48' and 125° 12' of E. longitude. The whole of Palawan is commonly included in that geographical demarcation and though

(1) See "Memoir on the forestal dcparment of the Philippine Islands, presented to H. E. the Minister for the Colonies, by Don Sebastian Vidal y Soler forestal Engineer."

the cession made of it to Spain by the Sultan of Borneo, about the middle of the last century, extended only to the northern part of the Island, it may be said that in the remainder of it, excepting however the military establishments which now exist, neither the mahomedan nor the Spanish dominion is a fact. In exchange, the island of Balabac which advances every day in its colonization has become included within the above mentioned limits.

This Island measures 13,850 square kilometres, it is placed on the western side of the Archipelago, extending in a N. E. and S. W. direction from the other Calamianes Islands, which are situated to the S. W. of Mindoro towards Borneo. Balabac Island which may be considered as a prolongation of Paragua from which it is separated by a strait, is also not very far from the northern extremity of Borneo The total length of Balabac is about fifty leagues and its width varies from 9 to 13.

A range of moderate elevation runs longitudinally from one extremity to the other, whence spring some small rivers. The climate is warm, humid and not very healthy, owing no doubt to the esccesive vegetation, as, what has happened at Balabac seems to indicate. There, the hygienical conditions have gone on improving as the woods were cleared away, a circumstance, which by no means authorizes the indiscriminate felling without study or method, as many pretend.

No facts relating to the geognostical composition of Paragua exist, nor of the group to which it belongs. As far as the vegetation is concerned, which is extremely rich, only that portion which is near the occupied parts has been explored, and as may be supposed, as in Balabac and the other islands forming the province of Calamianes, the *narra, ipil, banaba, dongon, palomaria, calantás, amoguis. bolongita,* and many other species valuable for their timber, gums resins, mastics, fruits, colouring matters, textiles, and medicinal qualities, grow there in great abundance. The existence of camphor, has not yet been proved though some assure that it here grows spontaneously.

SAMAR.

Is the most eastern island in the Philippine Archipelago, it forms part of the Visayas group, and is situated between 11º 1' and 12º 36' of N. latitude and 127º 53' and 129º 23' of E. longitude.

San Bernardino Straits separates it from Luzon island. Its surface measures 16,973 square kilometres.

It is impossible to give an accurate idea of the land relief of Samar for want of explorations made by competent travellers. The direction followed by rivers, indicates the existence of an elevated boundary running from N. to S., whence several ramifications descend in opposite directions. The most elevated peaks are denominated by the natives Curao, Matuginao, Capotaan, Palapa, and several others. Those of Palapa, Capotaan and Curao, stand towards the N. and center of the Island within Catubig's district; the Matuhinao, in that of Bungajon, is perhaps the most elevated. To these scanty facts it can be added, that the whole center of the island is extremely craggy, being crossed by ranges of mountains, ravines and precipices covered over by a giantlike vegetation.

The principal rivers are; the Oias, which has its origen towards the northeastern extremity of the central boundary, directs its course, first towards S. E. and afterwards to the East and ends in Uguis' roadstead on the eastern coast of the island after having run seven leagues; the Laguan, which springs up in the same boundary line, directs itself constantly towards the N. and traversing through Catubig ends in the roadstead of its own name, the Bató which derives its origin from the northern declivities of the mountains called Salta Sangley gathering the rain waters which descend trough them into two separate ramifications, runs, in a N. N. E. direction and ends in the same roadstead as the former one; the Timouini which comes down from the same declivities and runs parallel to the Bató, the Suribao which falls down from the central mountains and after directing its course towards S. E. flows out into the Pacific; and the Buruhan, of a lenght of four leagues, which runs, first towards N. E. and afterwards to the E. until it reaches the Pacific where it empities itself near Borrongan. Many other rives and rivulets cross through the virgin forests and fertile plains of that island.

The climate of Samar, as well as that of the neighbouring island of Leyte, enjoys the reputation of being very healthy. Jagor has consigned the following facts: The N. E. monsoon is the prevaling one in this locality overpowering in strenght and durability the S. W. monsoon, its intensity decreases on account of the sheltes offered by the islands situated in its direction, carrying along the absorved water in its passage through the great Ocean. In October variable winds prevails between N. W. and N. E. nevertheless, northerly winds predominate from the middle of November northeasterly winds become constand and last untill the beggining of April, seldom interrupted during that period by northerly winds. This is also the rainy season, December and January, being the most rainy

months during which sometimes the rains last for a fornight. On the northern coast, in Lauang, per instance, rains last from October to the end of December. From January to April there is dry weather, May, June and July are rainy months, August and September dry. Therefore, there are then two dry season and two wet ones. From October to November violent tempests (baguios or ty-foongs) occur sometimes; they begin generally from the N. changing to N. W. accompained by a drizzling rain, returns to the N. and E. with increasing strenght in which direction they rose to the maximum of their force, and afterwards they become moderate when blowing from the South, nevertheless, they sometimes pass rapidly from E. to S blowing with great violence.

From the end of March to the middle of June N. E., E. and S. E. breezes constantly predominate with a high sea breaking on the eastern coast. In May and June frequent tempests are experienced, forerunners of the S. W. monsoon which becomes steady in the months of July, August and September, but never with the constancy of the N. E monsoon. These three months constitue the dry season, nevertheless, it is frequently interrupted by squalls. There is scarcely a month without raining. In some years tempests are experienced every afternoon. In this season. the eastern coast is open to navigation, N. E. monsoon. Such generalities suffer frequent exeptions, principally on the S. W. coasts where the regularity of the air's current are influenced by the mountaineous island which deviate them. According the Geographical statement for 1855 page 345, every year at the change of the monsoon in September or October; it is observed and extraordinary raising of the sea (which in some instance attains a height of 60 and 70 feet) which is called *dolo* and shows an impetouse fury on the eastern and southern coasts, causing great damages, but fortunately of short duration.

The predominating rocks in Samar are the gneiss, micaceous and hornblendic slates and volcanic tophus. There are no ancient formations. In the mountains situated towards the interior between Parauas and Loquilocum rises some brecciated limestone rocks compact and of a grayish white, crossed by veins of calcareous spat; in this rock, very indistinct organic remains are observed, probably of corals. In Loquilocum river, beyond the little village of the same name, there are grayish yellow limestones in a very decomposed slate, forming unstratified masses. In several places alluvial deposits, coming from the rocks above indicated, are to be meet with. The forests of this island offer a robust and diversified vegetation as that of Mindanao, having until now been spared by the woodsman's axe on account to the many islands which are situated at a less distance from Manila possesing better anchorage for vessels carrying on the timber trade,

than Samar. The predominating tree species are the same as those of the other islands of Visayas and Mindanao, the *mo ave* surpassing all the other timbers as it seems to be very frequent in those forests.

PANAY.

Panay island is situated between 10° 23' and 11° 48' of N. latitud and 119° 30' and 120° 54' of E. longitude. Its surface measures 13081 square kilometres.

From the northwestern extremity of the island departs an extensive range which bending itself into a curve takes a southeastern direction rising gradually toward the little village of "Las Navas," where a transversal valley cuts it. From this valley it commences again to elevate itself untill it arrives to mount Opao, the highest in the island, then inclining to the E. and afterwards to the N. E. forms an arch which passes by the peak of Arcangel or Ba'ison and ends on the eastern coast of the island within the jurisdiction of Damarao; from this great range depart three principal ramifications, though not very high, and the whole of them fol'owing a southwestern and northeastern direction, terminates on the northern coast. Another remarkable boundary line, is that which in the jurisdiction of Buruanga descends from the main range already descrived, inclines itself first towards the N. to follow afterwards a northeastern and southern direction, giving origen to several ramifications, which run from N. E. to N. W. The most noteworthy rivers, are the Panay which flows from N. to S. bifurcating in two arms towards the end of its course, one of them ends near Capiz and the other in a place called Banica. The Aclan, which springs from mount Opao follows a southwestern and northeastern direction, receives countless little afluents and ends between Calibo and Macato after a course of 13 leagues. Tibiao descends from Madiaas mountain, forming a cascade of two hundred feet in height and continues in a northeastern and southwestern direction till its mouth. The Dalanas, which carries a greater volume of water than the former, has likewise its origen on Madiaa's declivities, flows in the same direction, and after seven leagues of an impetuous course ends between Tibiao and Bárbara. The river Cairnaon has its source in the so called Monte-alto (High Mountain), runs a distance of 14 leagues increasing its waters wich a great number of tributaries and flows out between Nalupa Nueva and Guisijan. The Paliuan, descends from the declivities of the same mountain, follows in an equal direction as the former one and enters into the sea between Guisijan and Bugacon. The Cagarauan parallel to the former ones,

comes down from Dumarao mount and ends at Bugacon The Sibalon, which carries a great volumen of water and is dangerous on account to the impetuosity of i s current, springs from Duminding mount and after a course of 20 leagues, ends in the neighbourhood of S. Pedro"s vi lage.

The climate of Panay island, presents the general characteristics peculiar to the other islands untill now descrived, and it is impossible to consign here accurate and special informations for want of adecuate studies. It is, generally speaking, humid and warm on the plains, and more so on low and marshy ground. The spontaneous vegetation is more abundant in the N. and W. than in the eastern part. The mountains are covere l over by extensive masses of trees. Nevertheless, in the range which separates the district of Capiz from that of Iloilo there only exist some wooded patches within the jurisdiction of Dumarao. The district truly forestal is that of Antique, as also that of Conception's Residency (Comandancia) and Guimarao island. The ruling tree species are equal to those which are found in the southern provinces·

MINDORO.

Mindoro island stand to the S. of Luzon, from which it is sep.rated by the strait of its name, and is comprehended between 12° 12' and 13° 31' 30" of N. latitude, and 123° 58' and 125° 15' of E. longitude. Its superficial extention is about 9543 square kilometres.

The lands relief is determined by three principal ranges. One of them departs from Calavite point, which is the northwestern extremity of the island, and forming several inflexions direct itself toward the S. E. presenting on the N. and S, some peaks high enough, as well as different ramifications descen ling to the coast where they end, either in gentle declivities or in craggy diffs. Near Naujan, a great ramification springs from it, which, following a direction, from N. E. to S. W. do not pierce to the center of the island. The second range is that which departing from the former one in Abra de Ilog, directs itself from N. to S. running parallel to the occidental coast to Sablayan village where it interrupts itself to penetrate again between that village and Irurum ending in Rumban point. The last range departs from the ramification near Naujan village. desceds from the first, following a N. E. and S. W. line, passes by the western side of Naujan lake constitues the mountain existing between it and Pola, takes a direction from N.

to S., parallel to the eastern coast of the island, and extends itself to Buruncan point. The two ridges, lateral or parallel to the eastern and western coast. not only depart from that which runs from N. W. to S. E. through the northern part of the island, but reunite themselves near its southern extremity. Therefore, it results in the central part an extensive elevated plain not exp'ored yet, proving its existence not only the direction of the ranges and its structure, but also the informations obtained from the savage inhabitans of the forests.

The rivers of Mindoro are so numerous that, only on the eastern coast from Calapan to Bulalacao, are numbered more than fifty, but the greatest part of them carry an insignificant volume of water becoming dry in summer, and no doubt there must exist in the interior many more completely unknown. Amongst the explorated rivers the principal are: the Malaylay directed from S. W. to N. E. between Bacó and Subuaan, the Nabuluan from N. to S., the Magasuang tubig, the Nabotas and the lake in Naujan from S. W. to N. E., the Pula and the Pola in the village of this name from W. to E., the Macaulit, the Bansod, the Masaguisi and the Bongabon between Pola and Ticling from N. W. to S. E., the Vasig, the Bunburan and Maujao between Ticling and Bulalacao running in the same direc ion as the three former ones, the Sabangan in Magarin from N. E. to S. W., the Pagbajan from N. to S, which ends at Paluan's roadstead the Tabinay in Puerto Galera from S. to N.

It enjoys of a mild climate, but the atmostpheric humidity is excessive on account of the considerable m sses of vegetation. The influence of the monsoons are felt in a different manner on the eastern and western coast, owing to the alterations brought about by the range which they meet in their passage. The timbers from Mindoro destined to be carried over to Manila market, are shipped on the eastern in the S. W. monsoon and on the western in the N. E. There are nevertheless sheltered ports, fit for all sort of weather such as Bulalacao, Punamalayan and Pola.

We do not posses any kind of informations about the geognostical composition of Mindoro island.

The ligneous vegetation has not been studied until now and a judgement of it can only be formed by the abundance of the species produced by the woods near the villages situated on the sea coast, where they are turned to account by those which carry on the timber trade. Amongst these species are found those which are so much esteemed for building, cabinet work as well as the superior Calantás so looked after for cigar boxes.

LEYTE.

This island stands between 9° 49' and 11° 34' of N. latitude and 127° 53' and 128° 53' of E. longitude, being its superficial extension of 11,517 square kilometres.

The land is very uneven, though there exist many valleys that allow of agrarian cultivation. A range running accross the island from N. to S. separates the streams which direct their course to the Pacific, from those that follow in an opposite direction towards Visayas sea. This boundary line parallel to the western coast in the whole of its lenght and from which it lays at a short distance, presents some summits high enough, such as Colasi Peak within the comprehension of Leyte, Mandivin Mountain in that of Palompon, which is the highest in the island and those of Capoocan, Ashun, and Libagay, all mantled over by thick forests.

The rivers, which, departing from the central boundary, flow towards the S. E. are the longest and carry more volume of water than those that run towards the West. The Maya, of a course that measures nine leagues, after passing on the south side of Dagamis village, ends into the Pacific Ocean. The Barrugo, springs in the mountains within the comprehension of Barauan, runs towards the north fertilizing with its waters Mangalang's fields, and those that belong to the village of its own name, and empities its water into Visayas sea near this village. The Leyte which runs in the same direction as the former one has its source in the lake that lays on the west of Jaro, irrigates the land belonging to the village of the same name and ends in the north coast of the island. The Bito, which emerges from the southeastern side of the lake of that name, directs its course towards the eastern coast carrying a large volume of water, though its lenght do not exceed over three leagues. The Masi, springs from the mountains which rise on the southern extremity of the island, flows about six leagues bathing the boundary of Maasin, and ends near the point of the S. W. The other rivers are not so important, and many of them remain dry during one part of the year.

This island possess a healthy climate though sultry; the winds blow frequently with impetuosity. The land presents indications of great physical perturbations as the effect caused by volcanoes which ought to have existed in this island, according to what is deduced from the rocks that appear on the surface of the land.

The spontaneous vegetation has not yet been studied. It abounds in trees which yield the most esteemed timbers amongst those which are common in the Archipelago.

NEGROS.

It is situated between 9° 5' and 10° 58' of N. latitude and 126° 02' and 127° 2' of E. longitude and measures a surface of 9,063 square kilometres.

A range which runs from N. to S. divides it in two portions, rendering difficult the communications between the eastern and western coast. The most elevated summits are constitute by Silay mountain situated towards the North, the Canlaon, a volcano in activity, which is not yet situated in the maps, and the Tipasi on the south. Some ramifications which descend from either side of the principal boundary sometimes reach till near the coasts.

The most considerable rivers are: the Danao which runs to the N. between Calatrava and Escalante presenting an average width of 200 metres and 15 or more of depth in some places, and the Marianas with its large branch called Tanao, which passes in direction to the north between the little village of the same name and Cadiz nuevo; it has a width of 300 metres and 10 of depth about a kilometre before its outlet. The other rivers are of lesser importance than the former ones.

No special studies has been made untill the present day, neither about the climate, nor on the geognostical constitution of the island.

The vegetal kingdom offers great richness and diversity, though the woodland are being confined to the summits, on account of the vigorons agricultural developement observed within these few years. There are, nevertheless, extensive mases of trees easely to be turned to account particularly in the northern portion of the islands. The species which in the Philippine islands are commonly applied to building purposes and Cabinet works, abound in them.

CEBU.

Its situation lays between 9° 25' 40" and 11° 00' 00" of N. latitude, and 126° 40' 00" and 127° 32' 30" of E. longitude. Its surface measures 6,792 square kilometres.

A ridge of little elevation running across the island from N. to S. do not hinder communications between the opposites coast. The rivers which depart from that boundary line, are of little importance for want of lenght in their streams, but the water which they carry might be turned to account for irrigation purposes.

The climate is very sultry and not too damp, an evil which is every day increasing owed to the extensive clearing of forests, which are not fit for agrarian cultivation being stony and sandy. With the clearing of woods, nothing has been attained, but the destruction of a considerable wealth without benefiting agriculture. The forests in former times, extensive and thickly peopled with trees, are now in a most lamentable condition, and almost reduced to couple of woodland patches: one in the southern, and the other on the northern portion of the island.

MASBATE.

This island is comprished between 11° 49' 00" and 12° 36' 00" of N. latitude, and 126° 47' 00"" and 127° 35' 00" of E. longitude measure a surface of 4071 square kilometres.

A semicircular ridge which commences in the southeastern extremity and ends in the southwestern, runs across the whole island being high enough in the center and depressed in the extremities. On its northeastern declivity the land is uneven, and through it descend several insignificant rivers, generally speaking, excepting however the Lauan which comes down from Bagasimbajan mountains. and runs from S. to N. ending at Barrera's roadstead. The southwestern declivity is the origin of countless rivers amongst which, the only one worthy to be mentioned is the Asit, which flows from N to S.

The climate of this island is warm and humid owing to extensive wood lands, and similar in its other characteristics to those of the southern part of Luzon from which it is not far. The land is composed of volcanic tophus, which produces by its decompositions a soil adapted to agrarian cultivation. Nevertheless, the surface destined to agricultural purpose is very limited, but in exchange exist valuable forests, which, conceal an immense riches in timbers adapted to building, cabinet work and every other application.

BOHOL.

The island of Bohol is included between 9° 42' 00" and 10° 14" 00" of N. latitude and 127° 15' 00" and 128° 02' 00" of E. longitude covering a surface of 2617 square kilometres.

Neither the lands relief, nor the conditions of the small rivers, which flows through its surface, offers any particular worthy to be mentioned.

The middle temperature experienced in Bohol is of 20° 8 and the average tension of watery vapor is of 8. 9, numbers which do

not much differ from those that correspond to Manila. The distribution of heat is however different. According to Semper, the month of June was in Bohol somewhat warmer than May; February was found to be the coldest one, the N. E. direction of the winds was sustained till beggining of June, a circumstance which ought to be considered as fixed; as it is observed, that, while in Manila the S. W. monsoon commences towards the end of April, and the N. E. in October, at Bohol, the first last one mouth the least prevailing only from July till the beggining of November. The observations made at Bohol during succesive years about the quantity and distribution of rains, gave, as a result, that the maximum in winter was of 209 lines; the minimum in spring 50 lines; in summer 109; and in autumn 123. While in Manila the dry season coincides with the coldest one there was in Bohol strong rains; winter, summer, and autumn were also aboundant in rains, so that in Bohol can only be mentioned a dry season, which is the spring, but not rainy one truly such.

The soils composition is analogous to that of Cebú island and though it wants fertility, is in its greatest part reduced to cultivation. The remains of the spontaneous vegetation, are scarce and on the other hand they offers very little interest.

CATANDUANES.

It is annexed to the province of Albay, and situated between 13° 30' 00" and 14° 07' 30' of N. latitude, and 127° 43' 30' and 128° 10' 00" of E. longitude, measuring 1803 square kilometres.

The interior of this island is traversed by three boundary lines which departing from the same central nucleus, follow, the first towards the N. point Yot, the second towards the S. E. till that of Nagunbuaya, and the third towards the S. W. till that of Agojo. The rivers which derive their origin from them, are insignificant.

The soil is adapted to agrarian cultivation, and it enjoys a temperate climate, but N. E. hurricanes are sometimes the cause of great damage to vegetation. The forestal region is restricted to the highest part of the declivities, where very little remains of its primitive richness.

MARINDUQUE.

It is included between 13° 11' 10" and 13° 33' 30", and 125° 31' 00" and 125° 51' 00' of E. longitude, measuring á surface of 829 square kilometres.

It is traversed from N. to S. by a range high enough, which ramifies towards, the E. and W. till very near to the coasts, so that two confined plains only remain, one to the N. and another to the S. W. and the esplanades near the villages of Gazan, Mogpog, and Santa Cruz The most remarkable mountains, are Japiain peak, Paguirajan and Puras to the N., San Antonio in the center of the island, Marlanga to the S. E. Marbangal, Catala, Malindig, Mainit and Malbog to the S. and Calapnit to the W., the Malindig being the highest of all, measnring about 1240 metres above the level of the sea.

There are several rivers, within the jurisdiction of Gazan which take a northerly direction and amongst them the most considerable one is the Laylay; in Magpho's jurisdiction there are also several which flow from N. E. to S. W. and, in that of Santa Cruz five more running from E. to W; but all of them of little importance. The climate is warm and humid and the prevailing winds are from N. E. and E. in November, December, January and February; S. E. and S. in March and April; S. and S. W. in May and June; and W. and N. W. in July and August.

The soil is argillaceous-limy in its greatest part, and sandy in the remaining. The former, offers excellent conditions for cultivation.

In some places of the island, the forests are as thick and healthy as those of Mindoro. Great number of tree species adapted to building are to be found in them, such as *camagon*, *dongon*, *mangachapuy*, *tindalo*, *aranga*, *apiton*, *bitanhol*, *dao*, *amuguis* and others. Nevertheless, expeculation is almost confined to the *calantás* timber which is brought down to Manila for cigar cases.

TABLAS.

This island appertaining to Romblon's district, is situated between 12° 02' and 12° 43' 50' of N. latitude, and 125° 36' 00' and 125° 44' 00' of E. longitude. It m asures a surface of 779 square kilometres.

Palaopao mountain rises in its centre and several rivulets flow through it. The woods abound in good building timber, which is exported to China in considerable quantity.

POLILLO.

It is situated on the Pacific Ocean and included between 14° 42' 00" and 15° 04' 50" of N. latitude, and 125° 23' 00' and 125° 46' 10" of E. longitude. It forms part of Infanta's district which occupies the neighbooring coast of Luzon. Its surface is of 74 square kilometres.

Several mountains high enough rise in the central part ot this island, and from those spring: Upata, Monleo and various other rivers of little importance. The soil is sandy and covered over by thick forest, which conceal great riches in timbers of all qualities.

BURIAS.

Burias is situated opposite to she southern coast of Luzon, between 13° 07' 30' and 13° 10' 30" of N. latitude and 126° 34' 50' and 126° 38' 00' of E. longitude. It is crossed by a range from S. E. to N. W. rising in the middle of it, thet peak called «Engañosa» surrounded by high cliffs and particularly on the northevestern side. This mountain, as well as those of less elevation, are only covered by extensive cogon grounds and underwoods, though in former times they contained much available timber.

TICAO.

This island extends from 12° 21' 20' to 12° 43' 00" of N. latitude, and from 127° 11' 12" to 127° 28' 30' of E. longitude. Its surface is about 34 square kilometres.

It is traversed from N. to S. by a range of little length intercepted by several ravines. On the northeastern declivity there is no more than cogon-land and hillocks; on the opposite, there are several forests with good timber for all sorts of applications.

No wood samples located in Harvard Wood Collection.
Only a random sample checked, however.
B. H. Wetmore, 1976.

Chapter II.

FORESTAL REVIEW.

An accomplished agriculturist, Mr. Paul de la Gironiere, and latterlly P. Buzeta, have calculate at 24.000,000 of hectares the incultivated surface of land in the Philippines or that which includes forests, waste lands and pasturage grounds, calculation which, does sufficiently differs from the appraisement made by the officials subordinated to the Forestal Inspection.

Without any other pretention that that of fixing the ideas relative to the true forestal surface in the Philippine Is ands, it is hereafter shown the results drawn from the said appraisement, indicating the predominant tree species, and those that are subordinated, which are found in each province or district.

Provinces and Districs.	Total surface. Hectares.	Forestal surface. Hectares.	TREE SPECIES.	
			Predominating.	**Subordinate.**
Cagayan	1.441,880	1.200.000	Molave, ipil, narra, yacal, mangachapuy, ébano, camagon, banaba, palomaria, dongon.....	Tasay, magalayao, panitogan, dalauan, anago, piampa, casila, babotalan, magatoloy and many others.

Ilocos Norte	356.900	250.000	Molave, banaba, sigay, balatinao, pino	Palomaria, dongon, narra, parunapin, cedro, tíndalo, roble, dalacan, batucan, catingan and others.
Ilocos Sur	151.850	78.000	Narra, banaba, camagon, molave, dongon, mangachapuy, tíndalo	Canaren, baticulin, calantás, parunapin, catingan, sagat, daeng.
Abra, Bontoc, Lepanto and Tiagan	561.538	450.000	Molave, ipil, roble, saleng or pino, banaba, camagon, cedro	Balingagtá, apuit, bangar, catingen, caratacat, casiray, abar, batucang, barincucurong, daeng, dalacan, bulala, deran, gasatan, limolimo, narra, panlongbeyen, tadulas ubion, sibucao.
Isabela and Saltan	1.371.309	1.000.000	Molave, narra, ipil, guijo, betis, bangcal, dongon	Magalayan, taasitan, tíndalo, culasi, bitong, obiun, panalapasan, balicatan, duluman.
Union and Benguet	343.942	250.000	Molave, saleng or pino, narra, roble, dungon, banaba.	Camagon, catingen, panglumbuyen, obiun, bacayao, baroncocorong, bacayas, calantás, parunapin, caliot.
Nueva Vizcaya	439.067	350.000	The same as in the former province	The same as in the former province.
Nueva Ecija	824.184	540.000	Acle, guijo, amuguis, malarujat, banaba, ipil, palomaria, paitan, lanete, pusipos, narra	Bilolo, calamansanay, bitog, anusip, palacpalac, lauaan, balacat, sacat, calumpit, anublin, pasac, betis, bulao, dampol, malabacaog, camagon, bancal, malabayabas, balinhasay, antipolo and many others.
	5.490.670	4.118.000		

Provinces and Districts.	Total surface. Hectares.	Forestal surface. Hectares.	TREE SPECIES.	
			Predominating.	Subordinate.
Carried forward....	5.490·670	4.118.000		
Príncipe	262.090	250.000	Ebano, camagon, narra, guisit, balayon, banaba, dongon, baticulin, palomaria.....	Hagachac, malatubig, bancal, magrilao molave. malapututan, talisay, dita, tamaoyan, bibit, dapdap, dilindigan, catmon, malarujat, batino, indan, dinglas.
Pangasinan	417.355	160.000	Molave, dungon, banaba, narra, mangachapuy, ipil, palomaria, bosili.....	Yacal, tíndalo, bacayao, yamban or guijo, balingatá, paitan, dapagan, bisol, balingasay, pamiralon, bolala, quitaquita, palonapuy, bitaog and others.
Zambales.....	425.402	336.000	Molave, narra, yacal, dongol, palomaria, bolangaeta, guijo, acle, baticulin, tangile.	Anagap, calantás, anusip, amuguis, manicnic, malarujat, mayapis, lauaan, malabulac, malasantol, malapapaya, himbabao, ipil, bancal and others.
Bataan.....	214.875	172.400	Lauaan, tangili, molave, banaba, mangachapuy, acle, dungon, lanete, baticulin, calantás, betis.....	Sandana, siacol, anagap, tíndalo, guijo, panao, dao, camayuan, catangbaculao, apalang, calumpit, antipolo, anubion, dalindingan, bingas, lanotan, calamansul, apalang.
Pampanga, Tarlac and Porac.....	436.333	200.000	Molave, narra, acle, betis, banaba, calamansanay, guijo.	Pasac, bitanhol, calumpit, palacpalac, bocboc, alalangad, anusip, bancal, talamurang, lanutan, sacat, palomaria, bilolo.

Bulacan	242.837	89.980	Yacal, saplungan, acle, asana, dongon, tíndalo, guijo, molave	Malarujat, aninapla, banaba, balao, calumpit, cupang, malaanonang, mangachapuy, calantás. baticulin, batitinan, macabingao.
Manila	66 457	30.000	Acle, guijo, sacat, dongon, banaba, batino, saplayan	Rubian, palomaria, malarujat, balao, cupang, baticulin, aninapla, lanete, sacat, bilolo, bitanhol.
Morong	84.570	81.500	Malaanonang, tiaong, mayapis, malasantol, malaitmo, lauan, tangili	Lanete, bayucan, bolongita, narra, calantás, baticulin, palomaria, ipil, yacal, saplungan, sacat, bocboc, palacpalac, bancal, batino, dungon, malarujat.
Laguna	266.829	104.785	Lauaan, tangili, mayapis, malaanonang, himbabao, lanete	Baticulin, camagon, narra, camayuan, antipolo, banito, malarujat, malaitmo, calamansanay, culingmanoc, amuguis, acle, malasaguing, talactalac, matanulang.
Infanta	251.177	160.000	Mangachapuy, mayapis, malagmat, malatiaong, banaba, aranga, lariangao	Hagac-hac, manapo, ébano, camagon, palomaria, tangal, batino, sacat, saplayan, ade, bolongita, malarujat, antipolo, baticulin, calantás, lanutan, balao.
Cavite	123.890	36.650	Amoguis, lanete, bansalaguin. acle, sandan	Molave, banaba, tondon, tíndalo, guijo, banaybanay, bancal, malarujat, calumpit, malabayabas.
Batangas	320.159	124.000	Banaba, dongon, betis, batino, lanete, duguan, amuguis, dalindingan, anagap	Molave, narra, ebano, camagon, ipil, mangachapuy, tíndalo, palomaria, danlig, balayon, bolonguita, yacal, antipolo, dita, margapalo, santol and others.
	8.702.644	5.863.315		

Provinces and Districs.	Total surface. Hectares.	Forestal surface. Hectares.	TREE SPECIES.	
			Predominating.	Subordinate.
Carried forward..	8.702.644	5.863.315		
Tayabas.....	562.492	380.000	Molave, narra, catmon, macaasin, guijo, maladongon, palomaria, betis, aranga, malarujat, danlig, bansalaguin, yacal and others.....	Alintatao, ebano, mangachapuy, antipolo, maguitarin, halopac, anio, culingmanoc, tanguisanguis, anunang, ananga bulacsica, lanutan, malarujat, malagmata basacan, botongmanoc, bayog, bancal, binting-dalaga and many others.
Camarines Norte.....	391.065	264.000	Narra, marang, guijo, panalsalan, mangachapuy, molave.....	Patoc, calantás, dancalan, malapajo, batitinan, bangati, matobato, malayac, macaasin, malatago, tangal, tamayuan, palomaria, hagahac, monpon, ugao, tangan and others.
Camarines Sur.....	615.078	307.000	Molave, guijo, amuguis, narra, anahoon, corongcorong, caracatmon. anahoon, mangachapuy, naga, nato, and dangcalan.....	Alintatao, acle, antipolo, bitanhol, bancal, balangan, baticosa, calabdab, camagon, dungon, dita, lanete, langca, malatapay, malabungao, matamata, palomaria, paitan, talisay, tindalo, tamayuan and others.
Albay.....	657.098	341.200	Batitinan, molave, malasinoro, guijo and anubling.	Mangachapuy, dungon, dinglas, palomaria, apiton, laguan, ébano, malaniguisan, bayucan, macasin, maladungon, alintatao.

Masbate	410.544	294.000	Molave, lauuan, calamansanay narra, tindalo	Maladongon, ipil, matobato, cubi, dungon, antipolo, pili, calantás, ébano, palomaria, banuyo, camagon, amuguis.			
Burias	29.935	»	»	»	»	»	
Mindoro	1.037.290	1.027.000	Molave, narra, ipil, dungon. banaba, guijo, calamansanay, amuguis, bancal, lauan	Camagon, alintatao, bolonguita, malatapay, ébano, tíndalo, yacal, mangachapuy, supa, anagap, acle, betis, batitinan, dinglas, malarujat, dalindingan, bansalaguin, ananapla, malasinoro and many others.			
Romblon	127.872	105.000	Ipil, dongon, supa, amuguis, antipolo, aranga, bancal, calantás	Molave, narra, camagon, malatapay, ébano, mangachapuy, tindalo, anagap, acle, betis, guijo, dalindingan, malarujat and many others.			
Capiz	402.510	134.000	Molave, narra, calotingan, bansalagon, nato, guijo, banati, bayuco	Calantás, amuguís, bancalabuan, ipil, miao, tindalo, mangachapuy, ponjan, cubi, bangati, sambulabuan, malagon, tabao and others.			
Antique	379,317	340.600	Bancalabuan, daguil, bayuco, jaras, narra, guijo, molave and others	Baslayan, banaba, ipil, bancalauag, banuyo, paijud, lanete, manbog, corongtingan, tapuyay, balanga, bugo, nato, baguilumboy camancluran, and others.			
	13.215.845	9.056.115					

Provinces and Districts.	Total surface. Hectares.	Forestal surface. Hectares.	TREE SPECIES.	
			Predominating.	**Subordinate.**
Carried forwazd.	13.215.845	9.056.115		
Iloilo and Concepcion's district.....	526.355	60.000	Apitong, banuyo, bayuco, hagat, miao, tapuyay, sambulabuan, ipil, cubi.....	Narra, tíndalo, molave, litis, duca, bugo, guijo, bancalauag.
Negros	906 396	730.000	Tugas or molave, camagon, balayon or tíndalo, malatapay, hantulinao, ipil, magtalisay, pasac, quijo, mangachapuy.....	Baybay, bintoco, sambag, lumboy, tolog-tolog, bayabas, balogo, pangatolan, batoan, soncol, sambayanag, bitoon, and many others.
Cebú.....	679.257	45.000	Mabinlod, quia-quia, guisoc, magpogalian, maquilomboy, and others.....	Molave, ipil, balayon, mangachapuy, catmon, cipolo, lanotan, pili, babdaban, caguibocboc, bonglas, putian, coog, ybo, daquit, doldol, and others.
Bohol.....	261.777	30.000	Cedro, dongon, ipil, molave, bagalanga, hindang, danglog.....	Lanete, ipil, catmon, laoan, cubi, sambulabuan, guisoc.
Leyte	1.151.710	760.000	Apiton, molve, guijo, baticulin, dongon, lauaan, lanete.	Apis-apis, adgad, bacau, camayuan, malacayuro, taog, hindan, manay-banay, cabag, pulo.

Samar	1.697.345	1.200.000	Molave, guijo, apiton, baticulin, naga, ipil, cubi, binolo.....	Bacatan, balao, basayon, bitangol, dancalang, bacao, dita, jambalalud, quirod, siao, manbog, narananca, nagalian, gaugauan, quili-quili, and others.
Mindanao.....	8.473.099	7.000 000	Molave, narra, yacal, ipil, dongon, mangachapuy, camagon, and many others, being still unknown which are the predominating, for want of forestal surveys....	. .
Calamianes (1).....	788.861	500.000	Neither Calamianes nor Paraguas woods had been surveyed.....	. .
Balabac	32.350	24.800	Ipil, banaba, asana, narra, pagatpat, bolonguita, amuguis, dapdap.....	Lanutan, ilang-ilang, lactan, achuetes, balibago, taloto, tan-ag, dungon, nato, bayoc, malabodoc, palomaria, tabigui, calantás, and many others.
	27.732.995	19.405.915		

(1) In the surface herein mentioned belonging to Calamianes, that of Paragua is not included.

The study of the Forestal Flora of the Philipine Island is of the greatest interest, but as the task has not yet been undertaken, it is impossible to consign here the botanical names corresponding with all the species previously designed by common names. We are therefore compelled limit ourselves to the principal species appearing in the Flora of Padre Blanco.

Common Names.	Botanical Names.
Red narra, apalit, naga and daitanag.	Pterocarpus Santalinus L.
White narra asana.....	Pterocarpus pallidus Bl.
Lanutan, lanotan.....	Unona latifolia L.
Guisihan, guisijan.....	Euphoria annularis Bl.
Matang-ulang.....	Salacia sinensis L.
Antipolo	Artocarpus incisa L.
Camagon.....	Diospyros discolor? Willd.
Bolongita, bolongeta, bolongaeta, blong-ita, dalondog, amaga.....	Diospyros pilosanthera Bl.
Mayapis	Dipterocarpus mayapis Bl.
Lauaan, sandana.....	Dipterocarpus thurifer L.
Malaanonang	D. malaanonang Bl.
Tangili.....	D. polyspermus Bl.
Lanete	Anasser laniti Bl.
Malasantol.....	Sandoricum indicum Car.
Malaitmo.....	Celtis philippinensis Bl.
Malaruhat, malarujat.....	Myrtus subrubens Bl.
Balete, baliti, nonoc, dalaguit, lonog.	Ficus indica L.
Do Do	Ficus elástica Roxb.
Culingmanoc.....	Laurus.
Ebano (Ebony).....	Diospyros nigra Bl.
Palomaría, bitanhol, bitoog, dancalan, dincalin, tamauian.....	Calophyllum inophyllum D. C.
Mangachapuy.....	Dipterocarpus mangachapoi Bl.
Banaba	Lagœrstremia speciosa Pers.
Manapo, panao, or bulao.....	Dipterocarpus vernicifluurs Bl.
Molave	Vitex geniculata Bl.
Dungon, dongon.....	Sterculia cymbiformis D. C.
Cupang	Mimosa peregrina?
Acle.....	Mimosa acle Bl.
Tindalo, balayon.....	Eperua rhomboidea Bl.
Calumpang.....	Sterculia faetida L.
Yacal, saplungan.....	Dipterocarpus plagatus Bl.
Ananapla, aninapla	Mimosa coriaria Bl.

Malatumbaga	Crudia spicata D. C.
Calantás, cedro	Cedrela odorata L.
Baticulin	Millingtonia quadripinnata Bl.
Amuguis	Cyrtocarpa quinquestila Bl.
Malabulac	Bombax ceyba L.
Pasac	Mimosa pserythroxylon Bos.
Pisapis or Palosapis	Dipter. palosapis Bl.
Anagap	Mimosa scutifera Bl.
Malapapaya	Aralia pendula Bl.
Himbabao	Broussonetia Luzonnensis Bl.
Ipil	Eperua decandra Bl.
Bancal, bangcal, bulala	Nauclea glaberrima DC.
Canafistula	Cassia fistula L.
Anubing	Artocarpus lamellosa?
Calamansanay	Gimbernatia calamansanay Bl.
Bitog, botong, bitoon	Barringtonia speciosa L.
Saleng	Pinus insularis Endl.
Betis	Azaola betis Bl.
Culasi	Petaloma alba Bl.
Mabolo, malatapay	Diospyros embriopteris Bl.
Solipa, malabayabas	Solipa pseudo-psidium Bl.
Calompang, tabigui, nigui	Xylocarpus granatum Kœn.
Calumpit	Terminalia edulis L.
Anubling	Artocarpus ovata, Bl.
Peris or piris	Bergesa compressa Bl.
Anahao, palmabrava	Coripha minor L.
Camonchile	Inga lanceolata Willd.
Pilapil	Flacourtia corollata Bl.
Dinglas	Bucida comintana Bl.
Apiton	Dipter grandiflorus Bl.
Duclitan	Syderoxilon duclitan Bl.
Banay-banay	Millingtonia pianata Bl.
Alintatao, dallloparen	Diospyros?
Abilo	Ycica abilo Bl.
Sampaloc, sambac	Tamarindus indica L.
Talisay, pandan	Terminalia mauritiana Lam.
Tangal, tangog	Rhizophora longissima Bl.
Bacao, biceas	Rhizohora gymnorhiza L.
Ligasan, pototan	Rhizophora candel L.
Anilao	Columbia anilao Bl.
Tapulao	Pinus Merkusii Yung.

A.—*Primary Products.*

Wood constitutes a primary product. The advantages derived from this, were entirely free and gratuitous before the 18th of December 1867, when a circular issued by the General Government, prohibited the felling of trees without its previous licence, though leaving in force the rights granted by the Law of the Indies to the natives for the use of the timber which they might want for their own necessities. According to this disposition, traders must previously obtain the necessary permision to cut down trees, indicating the province where they wish to use it, and the number, class, and dimensions of the logs they wish to collect, and after obtaining that grant, they proceed to cut down trees in the form and places where they think most convenient. The collection once made, the interested party gives information of it to the principal authority of the province sending him at the same time a detailed list of the number, class and dimensions of the timber. An official belonging to the forestal inspection, if there be one, or a delegate named by the provincial authority, revise and verify this list, and the interested party keeps it, after it has been signed by the public functionary, in order that it may be used as a permit for transporting the timber. A copy is sent up to the Forestal Inspection, which makes the valuation according to an established standard, orders the interested party to pay the corresponding sum, and after this has been duly done, expedites the necessary orders for the free disposal of the timber.

The intention in this practice is purely economical criterion, as the utilization is not subjected to any system of localization or replanting of trees, neither is the method determined which ought to be followed in the cutting, nor is there any responsability on the part of the grantees for the damages they may cause to the young trees, nor is the felling, in a word, subordinated to any general plan.

These defects are owing to the rudimentary state of the department, and, notiwthstandig the provisional Regulations for the forestal service in the Philippine islands passed by a Royal decree of 8th February 1873, they cannot be corrected without an increase of officials. According to these regulations, the trees to be felled should be previously determined on and afterwards sold by public auction, but taking in consideration, the impossibility of exclusively establising this system, special permissions are granted. The department, therefore, endeavours to establish technical principles in the utilisation of the forests, but the results which it obtains

in this sense, must necessarily be slow, its staff being so small as compared with that of Spain, while its forest area is twice as large.

With regard to the utilisation of fire wood, the prescribed restrictions have not been carried out for similar reasons.

B.—*Secondary Products.*

The utilization of barks for tanning, of textile, dyeing and medicinal plants and woods, and of resins, gums, gum-resins, juices and extracts, which in Europe constitute secundary products might alone produce a rich income to the State were the service properly organized, instead of the woods being, so to speak, the patrimony of those who live in them. The exportation of dye woods alone amounted in the year 1874 to 10.794.572 kilograms, the state only receiving the customs duty, $4.318: it being impossible to ascertain the local consumption. In the same year were exported 136 715 kilograms of gum-mastic and 22.155 of pitch, free of all duties or profit for the state, on quantity exported or quantity consumed. The same with the other secundary products, the utilization of which is not only completly gratuitous but is not even protected for the avoidance of damage to the forests. It therefore happens that trees of a hundred years growth, yielding the finest of timbers for building and cabinet work, are destroyed for the sake of obtaining their gum.

C.—*Transformed Products.*

The manufacture of charcoals and of products derived from resins, is almost unknown in this country. The first, is confined to satisfy the scanty demand for domestic use, for the forges, and the manufacture of gun-powder. The natives generally prefer fire-wood to charcoal for their domestic consumption. Even the steamers employed in the coasting trade employ fire wood, principally Bacauan, which is of great calorific power. As far as the resinous products are concerned, the whole industry is confined to the collection of what either flows naturally from the trees, or is obtained by means of rude and empirical incisions.

The distillation of extracts and essences constitutes a branch of industry wich has been carried on with considerable profit on a small scale.

D.—*Less important Products.*

None of these are worked to any considerable extent bees wax being the only on of any commercial importance. The collection of this and of honey, is still in a condition as primitive as that of the savages which gather these products and sell them to the Christians. During the months of May and July the collection takes place. In this epoch, the negritos and other mountain tribes commence their search. Before the larva becomes reanimated, they scare away the bees with the smoke of burned poisonous plants, take the combs, gather the wax, make it into cakes, and then barter them with the Christians for crystal beads, cigar-cases, rice, and tobacco.

The shrubs adapted to medicinal aplications, the feculas, and other analogous products, are the object of very limited speculation.

Chapter III.

ECONOMICAL REVIEW.

From what has been alrealy explained it will be easily understood, that the income from the public forests of the Archipelago, is far from being in proportion to the capital they represent, even comparing it with the less productive forests of Europe. Owing to the peculiar circumstances of the country, the greater part of the forests is still untouched, yet at least 2.000.000 hectares have been more or less worked. Taking as a type the income per hectare yielded by the State, forest land in Spain, which is far from highly cultivated as it does not surpass $0.295 as an average, the forest lands in the Philippine Islands should now yield $590,000 a year. The income which the State has obtained scince the payment for timber has been enforced are however only as follows.

Years.	Dollars.
1868.....	27.714
1869.....	31.341
1870.....	30.842
1871.....	38.946
1872.....	40.685
1873.....	45.711

These figures are small, but they shew a progresive movement in the trade, which is fast becoming more developed. The demand for timber in China and Japan, will constantly increase as those nations advance in civilization and material improvements. The construction of rail-roads is now beginning to be discussed in them, and the Philippine Islands offer the cheapest and nearest market. It is to be hoped, that, in a day not far distant, even in Europe, the timbers of this Archipelago will meet with an advantageous market, and although for building they cau not vie in cheapness with pine from the Baltic, they have no rival for ship building and for railway sleepers. When the hidden wealth of the Philippine forests becomes known, and the qualities of ther woods are studied, the result of the trade can no longer be doubtful.

In time and as traffic increases, roads and means for the exportation and transport of timbers should also improve. In this country there is as yet none of that practical teaching, so essential to this branch of the service. When the stimulus of competition becomes felt, the natives will learn to substitute the heavy knife and rude hatchet now in use by more useful tools, and there will be great improvement in the present rude means of transport and embarcation.

Transport by land is now excessively dear, but fortunately there are innumerable rivers by which timber can be floated either in rafts or logs, leaving but little land carriage, and these rivers, by clearing,

removing curves, and islets, by deepening their sandy beds, and by cutting occasional channels may be made of extreme advantage in transporting timber from the forests through which they flow.

Still, though expenses are increased by want of labor and appliances, the trade is by no means improfitable to those engaged in it.

The vessels employed in carrying timber to the Chinese markets of Hong-kong and Fuchow load at the places of cutting, and sail straight to their destination without touching at Manila.

Tablas, Tayabas, Mindoro, and the Concepcion have been hitherto the principal places of loading but there are many others where wood is as abundant and in as great variety, and where anchorage is as safe and roomy.

In the Archipelago the principal centres of consumption are the Capitals: Manila, Iloilo, Cebú, Vigan and others. Manila receives timber from almost all the mountains which are worked in the islands. Iloilo is provided principally from Negros, Guimaras and la Concepcion; Cebú from Leyte and Surigao (Mindanao), Vigan from the forests of the Abra. In each of these Capitals are merchants generally well supplied; but the price of warehoused timber is sometimes very high on account of the great demand for buildings. Constant increase may be expected in the consumption as the natives acquire new wants, and, for instance, wooden houses take the place of those of bamboo. Ship building and other industries will also profitably develope the trade. All augurs therefore, that the forests of the Philippines will, before long, yield a considerable income to the State, prove an abundant source of private wealth, and add materially to the progress of the Archipelago.

PART II.

CATALOGUE.

Numbers	Tagalog Names.	Systematic Names.
1	Binuñga.	Croton lacciferum L.
2	Tabigui-itim.	?
3	Agos-os.	Ficus hispida L.
4	Iguios.	Turræa virens L.
5	Malacamote.	?
6	Aimit.	Ficus glomerata L.
7	Tegbabasí.	?
8	Pasquit.	?
9	Alañgilan.	Unona odoratissima Bl.
10	Amuguis.	Cyrtocarpa quinquestila Bl.
11	Anunang.	Cordia Sebestena L.
12	Calayenguin,	?
13	Calicot.	?
14	Bahay.	?
15	Ata-ata.	Justicia ecbolium L.
16	Tangal-tangalan.	?
17	Malaga-api.	?
18	Pututan.	Rhizophora Candel L.
19	Putat.	Barringtonia racemosa Roxb.
20	Pipisic.	Avicennia tomentosa L.
21	Maladuas.	?
22	Tibig na pulá.	?
23	Molave.	Vitex geniculata Bl.
24	Duhat	Syzigium jambulanum D. C.
25	Manga.	Mangifera indica L.
26	Binuan.	?
27	Malagasaha.	?
28	Ligas.	Somecarpus anacardium L.
29	Lucban.	Citrus decumana L.
30	Balimbim.	Averrhoa Carambola L.
31	Lipata.	Excœcaria Agallocha L.
32	Tulucatiman.	?
33	Sanquit.	?
34	Balibago.	Hibiscus tiliaceus L.
35	Bayabas.	Psidium pyriferum L.
36	Bayagusá.	Tabœrnemontana globora Rl.
37	Mulato.	?
38	Tundutunducan.	?
39	Catmon.	Dillenia speciosa thunp.

Applications.
Some times employed for building, but generally for fuel.
Employed for house pillars.
Building, but not frequently.
Building.
Ceiling boards.
Some times used in light buildings.
Employed in house-building.
Cabinet work.
» »
Ceiling boards.
Cabinet flooring.
Buildings.
»
»
For oars.
Ship-building.
House building.
For paling; but generally for fuel.
Commonly used as fuel.
» » »
Employed in light buildings.
Some times employed in buildings.
Excellent for all building purposes.
Ceiling boards and fuel.
Mostly for its fruit.
Used for making canoes.
For house building.
Fruit and juice.
Mostly for gum.
Used in house building.
Building and fuel.
House building.
Building.
For its bark.
Principally for fuel.
Building.
,,
,,
House Planking

PRICE.

For the valuation of timbers generally used in the country for building, carpenter, and cabinet work, the prices ruling at the Province of Tayabas as a principal producing locality, canbe adopted as a standard. Collectors there fell and contract at following prices.

TARIFF

of prices of the best quality of timber in the Province of Tayabas.

Length	Width.	Thick.s	Price.	For every extra punto.
Varas.	Puntos.	Puntos.	Dollars.	Dollars.
Molave and Narra.				
3	10	10	0,375	0,032
4	10	10	0,500	0,063
5	10	10	0,625	0,095
6	10	10	0,750	0,125
7	10	10	1,000	1,063
8	10	10	1,500	0,250
9	10	10	2,000	0,375
10	10	10	2,500	0,500
11	10	10	3,500	1,000
12	10	10	5,000	1,500
Banaba and Batitinan.				
6	10	10	0,625	0,063
7	10	10	0,750	0,063
8	10	10	1,000	0,063
9	10	10	1,125	0,063
10	10	10	1,250	0,125
11	10	10	1,375	0,125
12	10	10	1,500	0,125
13	10	10	1,625	0,125

Numbers	Tagalog Names.	Systematic Names.
40	Cupang.	Mimosa peregrina L?
41	Calamios.	Averrhoa Bilimbi L.
42	Bulacsina.	Eriodendron aufractuosum D. C.
43	Pacat.	?
44	Banao.	?
45	Bulanguita ó Bolongita.	Diospyros pilosanthera Bl.
46	Dungun.	Sterculia cymbiformis D. C. v. indica.
47	Malauhud.	?
48	Guyong-casay.	?
49	Malabayabas.	Sulipa pseudopsidium Bl.
50	Betis.	Azaola Betis Bl.
51	Sunguhipon.	?
52	Malarayat.	?
53	Taliharap.	?
54	Alupay.	Euphoria Litschi Desf.
55	Talisay.	Terminalia mauritiana L.
56	Colasi.	Petaloma alba Bl.
57	Supa.	?
58	Tangantan.	?
59	Danniri.	?
60	Dapdap.	Erythrina carnea Ait.
61	Lanotan.	Unona latifolia Dunal.
62	Antipolo.	Artocarpus incisa L.
63	Malasungay.	?
64	Batinan-amú.	?
65	Alim.	Mallotus ricinoides Mull.
66	Batino.	Alstonia Batino Bl.
67	Bancal.	Nauclea glabemina D. C.
68	Camagon.	Diospyros sp.
69	Tuyayus.	?
70	Antique.	?
71	Bagulayac.	?
72	Anubing.	Artocarpus ovata.
73	Matangulang.	Salacia sinensis L.
74	Icogan.	?
75	Pahohotan.	Mangifera sp.
76	Bonglin.	Aralia péndula Bl.
77	Malacatmon.	Tetracera sarmentosa.
78	Paina.	?
79	Paling-nac.	?
80	Pili.	Canarium album L.
81	Bayog.	?
82	Tingantingan ó Cahoy dalaga.	Musscuda frondosa L.
88	Tibig.	?
84	Tangal.	Rhizophora longissima I
85	Quio.	?
86	Tanguisan baguio.	?

Aplications.	PRICE.				
	Length	Width.	Thick.s	Price.	For every extra punto.
	Varas.	Puntos.	Puntos.	Dollars.	Dollars.
	Banaba and Batitinan.				
Fuel.	14	10	10	1,750	0,125
Buildings.	15	10	10	2,000	0,250
Clogs.	16	10	10	2,250	0,250
Buildings.	17	10	10	2,500	0,250
"	18	10	10	3,000	0,375
Buildings and fuel.	19	10	10	3,500	0,375
Excellent for ship-building.	20	10	10	4,000	0,500
Cabinet work.	**Dnngun and Betis.**				
Buildings planks.	9	10	10	1,500	0,125
» »	10	10	10	1,750	0,125
Preferred for keels of vessels.	11	10	10	2,000	0,125
Cabinet work.	12	10	10	2,250	0,125
Buildings.	13	10	10	2,500	0,250
Plauking.	14	10	10	2,750	0,250
Building.	15	10	10	3,000	0,375
"	16	10	10	3,250	0,375
"	17	10	10	3,500	0,375
"	18	10	10	3,750	0,375
"	19	10	10	4,000	0,625
Shields and fire woods.	20	10	10	4,500	9,750
Plauking and oars.	**Supa.**				
Ships and houses.	9	10	10	1,250	0,125
Buildings and cabinet works.	10	10	10	1,500	0,125
» » »	11	10	10	1,750	0,125
Commonly for fuel.	12	10	10	2,000	0,187
Building.	13	10	10	2,250	0,187
Ships and building and cooperage.	14	10	10	2,500	0,250
Buildings and cabinet work.	15	10	10	2,750	0,250
Buildings.	16	10	10	3,000	0,312
»	17	10	10	3,250	0,312
»	18	10	10	3,500	0,375
House pillars.	19	10	10	3,750	0,375
» »	20	10	10	4,000	0,500
» »					
» »					
Clogs and fuel.					
Cabinet work.					
» »					
Buildings.					
Mostly for resin.					
Oars and fire woord.					
Buildings.					
Light buildings.					
Ship building and fuel.					
Buildings.					
,,					

NOTE.—The Spanish dollar is equivalent to 50 pence English. The vara contains 30 puntos or 33 English inches.

Numbers	Tagalog Names.	Systematic Names.
87	Bayetes.	Ficus sp.
88	Gogo.	Entada Pursætha Dec.
89	Tiuí.	?
90	Taquip-asin.	?
91	Tamyang.	?
92	Buton.	Barringtonia speciosa L.
93	Palsaguinguin.	Canarium Pimela.
94	Opling-maya.	?
95	Macaasin blanco.	?
96	Macaasin colorado.	?
97	Tabigui.	Xilocarpus granatum Kön.
98	Malacadios.	Ageratium calomala Bl?
99	Paho.	Mangifera altíssima Bl.
100	Malagaitman.	?
101	Magarilao.	?
102	Maladuñgun.	?
103	Hauili.	Ficus laurifolia L.
104	Guyong-guyong.	Hypericum olympicum L.
105	Colong-colong.	Hernandia pellata D. C.
106	Caliñgag.	Cinnamomum Culilawan Blume.
107	Malasaguin colorado.	?
108	Malasaguin.	?
109	Malamanca.	?
110	Calimantao.	Antidesma alexiteria Bl.
111	Cabal.	Fagræa scholaris?
112	Balocbaloc ó Cacaocacauan.	Galedupa maculata Bl.
113	Dug-an.	Myristica luzonica? Bl.
114	Ma'ataba.	?
115	Malatubig.	?
116	Malayambo.	?
117	Palis.	Callicarpa americana L.
118	Malaitmo.	Celtis philippinensis Bl.
119	Caytana.	Fagara piperita L.
120	Tinaan-pantay.	?
121	Tucangcalo.	?
122	Manabang.	?
123	Tanguisin bayabac.	Ficus rostrata El.
124	Lapolapo.	Gyrocarpus lobatus Bl?
125	Bangcoso.	Mornida ligulata Bl.
126	As-is.	Ficus hispida v. linearis Bl.
127	Manayao.	?
128	Uban.	?
129	Tuya-tuya.	?
130	Bait.	Euphorbia pentagona L?
131	Anilao.	Columbia Anilao Bl.
132	Tagarao.	Sponia amborinensis Decs.
133	Lipoti.	?

Aplications.
Seldom in buildings.
The bark is emp oyed as natural soap.
Buildings.
,,
,,
Planking.
Mostly for resin.
Lhigt buildings.
"
" and cabinet work.
Mostly for dyeing.
Buildings.
A fruit tree.
Buildings.
»
»
»
Mostly for fuel.
Wheels.
The bark is useful.
Cabinet work.
» »
Light buildings.
House planking.
Buildings.
,,
Building and Gum.
Buildings.
,,
"
"
"
Most'y for bark.
Light constructions.
uildings.
,,
Mostly for its juice.
Shields.
Mostly for bark.
Mostly for fuel.
Light constructions.
,, ,,
Cabinet work.
Buildings.
Fuel and bark useful.
Buildings.
,,

PRICE.

Timbers of other qualities are assimilated, to those in the tariff. Collectors transport timbers to vessels at about 8 to 10 per cent extra.

Cost to merchants is along up to 50 per cent. over tarift prices.

The price current for timbers, per cubic feet, at Manila market, is about the following.

	Ps.	Cénts.		Ps.	Cénts.
Molave.....	"	50	Malatapay..	1	25
Ipil.....	"	43 6/8	Alintatao...	1	75
Guijo.....	"	31 2/8	Lauaan	"	12 1/8
Banaba.....	"	37 4/8	Calantás ...	"	25
Calamansa-nay.....	"	31 2/8	Lanotan....	"	25
Dungon.....	"	43 6/8	Balao.....	"	50
Mangacha-puy.....	"	37 4/8	Bancal.....	"	25
Betis.....	"	43 6/8	Cacauate...	"	37 4/8
Acle	"	37 4/8	Calumpit...	"	37 4/8
Narra.....	"	43 6/8	Mangasino-ro	"	43 6/8
Tíndalo.....	"	37 4/8	Paitan.....	"	25
Yacal.....	"	37 4/8	Tangil i.....	"	43 6/8
Baticulin...	"	43 6/8	Palmas bra-vas, each 25.....	1	25
Camagon...	2	25			

Split sapan-wood is employed for dyeing and form, a considerable export.—Prices range from $0-87 4/8 to $1-25 per picul.

Numbers	Tagalog Names.	Systematic Names.
134	Loctob.	?
135	Molauin aso.	Vitex sp.
136	Tan-ag.	Klenihovia hospíta L.
137	Yacal blanco.	Anisoptera plagata Bl.
138	Yacal.	Anisoptera plagata Bl var?
139	Tangilí.	Dipterocarpus polyspermum Bl.
140	Mospos.	?
141	Ligaá.	?
142	Layasín.	?
143	Guijo, Bitic.	Anisoptera Guiso Bl.
144	Bacanan.	Rhizophora gymnorhíza L.
145	Acle.	Mimosa Acle Bl.
146	Langaray.	?
147	Lanutan dilao.	?
148	Labaya.	?
149	Salab.	Mo inæa arborea L?
150	Mayapis.	Dipterocarpus Mayapis Bl.
151	Malaruhat.	Myrtus subrubens Bl.
152	Hanagdon.	Ficus sp.
153	Hamohamo.	?
154	Hagod.	?
155	Camuning.	Connarus santaloides D. C.
156	Dinglas.	Bucida comintana Bl.
157	Camonchiles.	Inga lanceolata Willd.
158	Calumpit.	Termina'ia edulis L.
159	Guisac.	?
160	Guis-guis.	?
161	Hongo.	?
162	Magarambnlo.	?
163	Laniti.	Anasser Laniti Bl.
164	Calantás.	Cedrela odorata L.
165	Libato.	Basella rubra L.
166	Botong-manoc.	Millyngtonia pinnata Bl.
167	Gimmamalí.	?
168	Gauay-gauay.	?
169	Malapaho.	Dipterocarpus vernicifluus Bl.
170	Balayon blanco.	Eperua rhomboidea Bl.
171	Dita.	Alstonia scholaris R. Bs.
172	Danlig blanco.	Bridelia sp.
173	Dampol.	?
174	Dambuhala.	?
175	Santol.	Sandoricum indicum Cav.
176	Lagundi.	Vitex trífolia L.
177	Narra.	Pterocarpus santalinus L.
178	Palomaria, Tamayuan.	Calophyllum inophyllum D. C.
179	Dao.	Paliurus Dao Bl.
180	Danlig amarillo.	?

Aplications.	PRICE.
Buildings.	
»	
Fuel and bark usefu'.	
Buildings.	
»	
"	
Canoes and Boats.	
» "	
» "	
Ships and houses.	
Mostly as fuel.	
Ships and houses.	
Buildings.	
"	
"	
"	
Ships.	
Building and cabinet work.	
Commonly used for fuel.	
Light buildings.	
» »	
Cabinet work.	
Buildings.	
Mostly for charcoal and bark.	
Buildings.	
Cabinet work.	
» »	
Buildings.	
» »	
Cabinet work.	
Canoes and cigars boxes.	
Ship building.	
Buildings.	
,,	
,,	
,,	
Cabinet work.	
Planking and fuel.	
Floor planking.	
Buildings.	
,,	
Cabinet work.	
,, ,,	
,, ,, Excellent.	
Ships and houses.	
Canoes and bui'dings.	
House planking.	

Numbers	Tagalog Names.	Systematic Names.
181	Dilang butiquí blanco.	?
182	Lumban.	Alcurites triloba Forst.
183	Ma atapay, Mabolo.	Diospyros embriopteris Bl.
184	Apitong.	Dipterocarpus grandiflorus Bl.
185	Camansi.	Artocarpus Camansi Bl.
186	Dulitan blanco.	?
187	Du itan co'orado.	?
188	Dilang butiqui amarillo.	?
189	Anagap.	Mimosa scutifera Bl.
190	Banaba.	Lagærstremia speciosa Pers.
191	Toloto.	Heritiera littoralis Ait.
192	Da'iri.	?
193	Basiad.	?
194	Batayasua.	?
195	Binting dalaga.	?
196	Bilucao.	?
197	Bayanti.	?
198	Bugos.	?
199	Bocboc.	?
200	Bagobanga.	?
201	Cuyas-cuyas.	?
202	Culingmanoc.	?
203	Culi isiao.	?
204	Bansalaguin	?
205	Basacan.	?
206	Dalinti.	?
207	Balay-ohod.	?
208	Balinaonao.	?
209	Balobo.	?
210	Amontay.	?
211	Bagó.	?
212	Aranga.	?
213	Amlang.	?
214	Alahan.	?
215	Alagao.	Premna odorata,
216	Aduas.	?
217	Lauan.	Anisoptera thurifera Bl.
218	Anong.	?
219	Lamio.	Paliurus lamiyo Bl.
220	Oplí.	?
221	Simacquin.	?
222	Saguisi (palma).	?
223	Cologcog.	?
224	Limaima.	Paratropia crassa Bl.
225	Anangqui.	?
226	Anabo.	?
227	Iba.	Cicca acidissima L.

Aplications.	PRICE.
Cabinet work.	
Mostly for its Oil.	
Cabinet work.	
Ships.	
Buildings.	
Ship planks.	
,,	
Cabinet work.	
Casks.	
Ships and houses.	
Canoes.	
Cabinet work.	
Light buildings.	
,, ,,	
Building.	
,,	
Light buildings.	
House pillars and fuel.	
Buildings.	
,,	
,, and cabinet work.	
Cabinet work.	
Buildings.	
Planking and fire wood.	
Buildings.	
,,	
,,	
,, and for fuel.	
Cabinet work.	
,,	
,,	
Ships and houses.	
Buildings.	
Cabinet work.	
Mostly fuel.	
,, ,,	
Ship building.	
Buildings and cabinet work.	
,,	
Mostly fuel.	
House planking.	
,, pillars.	
Bui dings.	
Planking.	
Buildings	
Mostly for fuel.	
Buildings.	

Numbers	Tagalog Names.	Systematic Names.
228	Macupa.	Jambosa vulgaris D. C.
229	Bagauac.	?
230	Camatug.	?
231	Malasangqui.	?
232	Ba'ete.	Ficus indica Roxb.
233	Bañgal.	Thoa edulis Willd.
234	Narra.	Pterocarpus santalinus L. var. pallida.
235	Pugahan.	Caryota urens L.
236	Sipitcayg.	?
237	Sagasá.	?
238	Ipil.	Eperua decandra Bl.
239	Gatasan.	?
240	Gatasan maputi.	?
241	Gatasan mapulá.	?
242	Ma'agahanip.	?
243	Malabonga.	Laurus hexandra L.
244	Banalo.	Thespesia Banalo Bl.
245	Banuyo.	?
246	Midbid.	?
247	Aguyng.	?
248	Mangachapoi.	Anisoptera Mangachapoi D. C.
249	Malacmalac.	Clethra alnifolia L.
250	Boñgalun.	?
251	Malapiga.	?
252	Maraug.	?
263	Bacan.	?
254	Malaya.	?
255	Biñga-biñga.	?
256	Bulao.	Vitex latifolia Mill.
257	Maladicay.	?
258	Canomay.	Diospyros lotus L.
259	Nanca.	Artocarpus integrifolia L.
260	Cagel.	Citrus aurantium L.
261	Dungun of mangle.	?
262	Dalindingan.	?
263	Dalunut.	Urtica arborescens L.
264	Tibanglang (palma).	Areca sp.
265	Gabolo.	Laurus sp.
266	Pagatpat.	Sonneratia Pagatpat Pers.]
267	Pusopuso.	Sebifera glutinosa Pour.
268	Hagachac.	Dipterocarpus sp.
269	Ebano.	Diospyros Sapota Roxb var. nigra.
270	Ma'ipaga.	?
271	Sandolaitan.	Sophora tomentosa L.
272	Sampaloc.	Tamarindus indica L.
273	Tambontambon.	?

Aplicatione.	PRICE.
Light buildings.	
Mostly for fuel.	
Buildings.	
"	
Planking.	
Buildings.	
Cabinet work.	
Bridges and house pillars.	
Buildings.	
Cabinet work.	
Buildings.	
Cabinet work.	
Planking.	
Buildings.	
"	
"	
Cabinet work.	
"	
"	
"	
Ship building.	
Buildings.	
Building and fuel.	
Buildings.	
"	
"	
"	
"	
Much looked after for all sorts of constructions.	
Buildings.	
Cabinet work.	
Musical instruments.	
Fruit.	
Mostly fuel.	
Buildings.	
Mostly for bask.	
Bridges and house pillars.	
Buildings.	
House pillars and ships timbers.	
Buildings.	
Ship building.	
Cabinet work.	
Planking.	
Cabinet work.	
Roots used in cabinet work.	
Light buildings.	

Numbers	Tágaleg Names.	Systematic Names.
274	Tuytuguin.	?
275	Sungsungen.	?
276	Tibatib.	?
277	Taratara.	Cedrela taratara Bl.
278	Sibucao.	Cesalpinia sappan L.
279	Palayen.	Quercus Jordanœ Lag.
280	Tapulao.	Pinus Merkusii Jung et Vriese.
281	Kaleng.	Pinus insularis Endl.

Numbers 562 to 582 inclusive, belong to a collection of small varnished boards
Numbers 563 to 568 inclusive, are those of six cases containing *the Herbarium*

II. FIRE

Reside the ligneous species which have already been mentioned in the list of the same

Numbers	Tagalog Names.	Systematic Names.
569	Alas-ás.	Pandanus exaltatus.
570	Alibanban.	Bauhinia tomentosa L.
571	Amamali.	?
572	Amuyon.	Unona cauliflora B.
573	Anagás.	?
574	Analib.	?
575	Babayan.	?
576	Balinhasay.	Fagara decandra Bl.
577	Batobato.	Laurus lanosa Bl.
578	Bignay.	Stilago bunius L.
579	Binayuyu.	?
580	Buctay.	?
581	Calius.	Calius lactescens Bl.
582	Diladila aso.	Canopteris quadripinnata.
583	Haponandiuas.	?
584	Malabayoc.	?
585	Malacbi.	Aristolochia.
586	Malaranon.	?
587	Malimali.	Leca aculeata Blume.
588	Palipit.	?

Aplicaticns.	PRICE.
Buildings.	
»	
»	
Mostly for Boxes.	
A dye wood.	
Not applied yet in buildings on account of difficulties in getting it.	
Buildings.	
Used by savages for Huts: and for torches.	

from the same species as those before mentioned.
of botanical species: samples in rolls and sma l boards.

WOOD.

samples for timber, and which are used as fuel the following are also applied to purpose.

Observations.	PRICE.
From mountains.	Fire wood is sold mixed and at different prices according to size of logs or split pieces. One thousend logs of 1.m 50 in length from Tablas island, is sold at Manila for $30: of 1.m in length from Tayabas at $20 of 0.m 80 in from Zubic (Province of Zambales), at $1-50, and by the *talacsan* at $5 for each. The *talacsan* is a pile of pieces of all lengths, measuring 2 varas in width and two in height.

Numbers	Tagalog Names.	Systematic Names.
589	Sain.	?
590	Tablon.	Fragia bracteata Bl.
591	Vacotan.	?
592	Apis-apis.	Batis hermaphrodita Bl.
593	Binas.	?
594	Su'asi.	Ocymum americanum.
595	Tagapá.	?
596	Timbambaques.	?

III. COALS

The only coals and ashes used

Numbers	Tagalog Names.	Systematic Names.
597	Cabogbog.	Cansiera grosularioides D. C.
598	Camonchi'e.	Inga lanceolata Willd.
599	Guyong-guyong.	Hypericum olympicum L.
600	Tan-ag.	Kleinhovia hospita L.
601	Tuba or Casla.	Jatropha Curcas L.
602	Bignai or Bugnai.	Stilago bunius L.
603	Bacauan.	Rhizophora gymnorhiza L.
604	Ba'ibago.	Hibiscus tiliaceus L.
605	Cabugao.	Citrus decumana L.
606	Bonote de coco.	Cocos nucifera L.
607	Tongo or tangal.	Rhizopho a longissima L.
608	Guayaba.	Psidium pyriferum L.
609	Dampalit.	Sesuvium Portulacastrum L.
610	Laguio-laguio.	Acanthus ilicifolius L.
611	Pipis'c.	Avicennia tomentosa L.
612	Longa.	Sesamum indicum L.
613	Quilites.	Amarantus spinosus L.
614	Tongo or tangal.	Rhizophora longissima L.
615	Bacao.	Rhizophora gymnorhiza L.
616	Balibago.	Hibiscus tiliaceus L.
617	Guayaba.	Psidium pyriferum L.

Observations.	PRICE.
From mountains.	
From the coasts.	

AND ASHES.

in the country are the following.

Aplications.	PRICE.
Coals used for forges. " " " gun powder. " " " forges. " " " gun powder. Reduced to powder, is used for blacknig. Coals used for forges. " " " ironing linen. " " " gun powder. " for domestic use. " " " " " " " " " " " " Ashes for gun powder. "	The wholesale price obtained for first quality coals is $1-50 for Cubic metre, and $0-75 for second.

Numbers	Tagalog Names.	Systematic Names.
618	Cayutana.	Fagara piperita L.
619	Dita.	Alstonia scholaris R. B.
620	Anonang.	Cordia sebestena L.
621	Manga.	Mangifera indica L.
622	Chico.	Achras sapota L.
623	Tabigui or Nigui.	Xilocarpus granatum Kien.
624	Caliñgag.	Cinamommum culilawan Blume.
625	Cañafistu'a.	C ssia fi tula L.
626	Iguio.	Turræa virens L.
627	Talisay.	Terminalia latifolia.
628	Ca'umpit.	Terminalia edulis L.
629	Bacauan.	Rhizophora gymnorhiza L.
630	Tangal.	Rhizophora longissima L.
631	Betis.	Azuola Betis Bl.
632	Pasao na bilog.	Corchorus capsularis L.
633	Danglin.	Grovia Mallococa L.
634	Calasusi or Calachuchi.	Plumiera alba L.
635	Tuc or Toi.	Spathodea luzonica Bl.
636	Calocatingan.	Pterospermum semisagitattum Roxb.
637	Camonchile.	Inga lanceolata Wi'ld,
638	Botoi or bulacsina.	Bombax pentandrum L.
639	Balibago.	Hibiscus ti'iaceus L,
640	Escobang haba.	Sida frutescens Cav.
641	Anabo.	Napæa scabra Bl.
642	Narra.	Pterocarpus santalinus L.
643	Dapdap.	Erythrina carnea Ait.
644	Caturai.	Sesbania grandiflora Poir.
645	Anibong.	Abroma alata Bl.
646	Cagel.	Citrus aurantium L.
647	Tanag.	Kleinhovia hospita L.
648	Taloto.	Heritiera litoralis Ait.
649	Agoho.	Casuarina equisetifolia Fart.
650	Antipolo.	Artocarpus incisa L.
651	Tangisan bayabac.	Ficus rostrata Bl.
652	Balete.	Ficus indica Roxb.
653	Tibig na lalaqui.	Ficus glomerata L.
654	Amirai.	Urtica nivea L.
655	Botolan.	Cicca pentandra Bl.
656	Dariangao or Ananapla.	Mimosa coriaria Rl.
657	Ac'e.	Mimosa acle Bl.
658	Bagó.	Gnetum Gnemon L.
659	Binoñga.	Croton lacciferum L.
660	Hingongoto.	Clutia stipularis L.
661	Balicnong.	Melochia arborea Bl.
662	Banot.	Bauhinia scandens L.

ARKS.

Aplications.	PRICE.
Used as medicine.	Prices for tanning and dying barks, are according to quality and range from $0-75 to $1-75.
" " "	
" " "	
" for dying.	
" as medicine.	
" for dying.	
" as medicine.	
" for tanning.	
" as medicine.	
" for dying.	
" " "	
" " "	
" for dying, and streng thening arrack.	
" as medicine.	
" for cordage.	
" " "	
" as medicine.	
Dyeing.	
"	
Taning.	
Dyeing.	
Cordage, paperand w ca ving	
"	
"	
Tanning.	
Medicine.	
Dyeing fishnig nets.	
Cordage.	
Medicine.	
Cordage.	
Dyeing.	
Medicine.	
Dyeing.	
Dyeing and tanning.	
Tanning.	
Dyeing.	
Weaving.	
Dyeing.	
Tanning.	
Natural soap.	
Cordage.	
Strengthening arrack.	
Cordage.	
"	
"	

Numbers	Tagalog Names.	Systematic Names.
663	Anilao.	Columbia anilao Bl.
664	Calumpang.	Sterculia fœtida L.
665	Bayog.	Cterospermum hastatum Bl,
666	Banilad.	Sterculia cordifolia Cav.
667	Bahay.	Fagara pterota?
668	Bangoso ó Nino.	Morinda ligulata Bl.

V. ROSINS GUMS

669	Bintoco gum.	Evodia bintoco Bl.
670	Limalima rosin.	Baratropia crassa Bl.
671	Casoy gum.	Cassuvium remiforme Bl.
672	Bonga "	Bauhinia grandiflora Juss.
673	Abilo rosin.	Icica abilo Bl.
674	Tangantangan oil.	Ricinus communis L.
675	Laca gum.	Ficus laccifera Bl.
676	Duca "	Sapindus guisian Bl.
677	Gutagamba of Taclang-auac.	Cambogia venulosa.
678	Black pitch or Anten.	Canarium pimela Kœn.
679	White pitch or of piles.	Canarium album L.
680	Alipata rosin.	Excaecaria Agallocha Müll.
681	Balao or Malapaho rosin.	Dipterocarpus vernicifluus Bl.
682	Tapulao rosin.	Pinus Merkussii Jung et Vrieuse.
683	Tahamaca or Matang-arao rosin,	Fagara octandra Bl.
684	Lauaan rosin.	Anisoptera thurifera Blume.
635	Binucao "	Cambogia binucao Bl.
686	Mayapis "	Dipterocarpus Mayapis Bl.
687	Apiton "	Dipterocarpus grandiflorus Bl.
688	Red narra gum.	Pterocarpus santalinus L.
689	Antipolo rosin.	Artocarpus incisa L.
690	Camansi "	Artocarpus camansi Bl.
691	Lucban gum.	Citrus decumana L.
692	Palomaria "	Calophyllum Inophyllum D. C.
693	Dugoan "	Myristiea luzonica Bl.
694	Aromo "	Mimosa farnesiana Willd.
695	Binoñga rosin.	Croton lacciferum L.
696	Biñgabing gum.	Croton grandifolius Bl.
697	Lumban oil.	Aleurites triloba Forst.
698	Dariangao rosin.	Mimosa coriaria Bl.
699	Saleng "	Pinus insularis Endl.
700	Caturay "	Sesbania grandiflora Poir.
701	Tagocasin "	Adelia resinosa Bl.
702	Dita gum.	Alstonia Scholaris R. B.
703	Cocoa nut oil.	Cocos nucifera L.

Aplications.	PRICE.
Cordage.	
"	
"	
"	
"	
Tanning.	

AND OILS.

Varnish.	Of the productions in this section there are many in which there is no trade and others in which there is little so that the prices are very uncertain. The best known are the Malapaho rosin, which is sold at $1 per ganta (three litres): Lanaan resin at $0-50 per to (or 0,230 kils): White pitch, in cakes obtains from $16 to $20 per 100 cakes: Black Pitch from $9 to $12 per 100 cakes: Lumban oil at $0-37½ per ganta; and Cocoa nut oil at $0-50 per ganta, though this rate is only obtained according to quality and origin, as that of Visayas is not so looked for as that of the Laguna and Tayabas. Cocoa nut oil is an article of great consumption in the Philippine Islands, and forms a considerable item in exports.
"	
"	
Medicine.	
"	
"	
Dyeing.	
"	
Painting.	
Jorches.	
Caulking vessels.	
" "	
" "	
" "	
Medicine.	
Incense and varnish.	
Painting and medicine.	
Varnish.	
"	
Medicine.	
Bird-lime.	
"	
Medicine.	
"	
"	
"	
"	
"	
Lighting, painting and caulking.	
Varnish.	
Lighting.	
Medicine.	
"	
"	
Lighting and other use.	

Numbers	Tagalog Names.	Systematic Names.
704	Boboi.	Eriodendron anfractuosum D. C.
705	Canon.	Caryota onusta Bl.
706	Banaba.	Lagerstræmia speciosa Pers.
707	Dapdap.	Erythrina carnea L. ?
708	False ipil.	Mimosa ? aggregata Pers.
709	Lanete.	Anasser Laniti Bl.
710	Bacao.	Rhizophora Mangle L.
711	Caliantang.	Leea sambucina Willd.
712	Palomaria.	Calophyllum Inophyllum D. C.
713	Sibucao (Sapanwood.)	Cesalpinia Sappan L.
714	Tuba.	Jatropha Curcas L.
715	Ilang-ilang.	Unona odoratissima L.
716	Tumbon-aso.	Morinda littoralis Bl.
717	Is-is.	Ficus hispida L.
718	Pagatpat.	Sonneratia Pagatpat Pers.
719	Tibig.	Ficus aspera L.
720	Guayaba.	Psidium pomiferum L.
721	Cabugao, Colobot.	Citrus torosa Bl.
722	Calamundi or Calamansi.	Citrus mitis Bl?
723	Catmon.	Dillenia speciosa Thunb.
724	Santol.	Sandoricum indicum Cav.
725	Mabolo.	Diospyros Blaocci D. C.
726	Narangita.	Citrus nobilis L?
727	Cagel.	Citrus aurantium L.
728	Manga.	Mangifera indica L.
729	Botong, bayac cabayo.	Barringtoma speciosa Bl.
730	Himamao.	Turræa octandra Bl.
731	Rima.	Artocarpus Rima Bl.
732	Dalungian, Dologian.	Artocarpus Camansi Bl.
733	Malaitmo.	Celtis philippinensis Bl?
734	Balibago.	Hibiscus tiliaceus L.
735	Bignai.	Stilago bunius L.
736	Libato.	Basella rubra L.
737	Bacauan.	Rhizophora gymnorhiza L.
738	Lamio.	Paliurus Lamiyo Bl.
739	Palsahinhin.	Canarium Pimela Kœn.
740	Maná.	Jatropha janifa Thunb.
741	Iba.	Cicca acidissima.
742	Manzana.	Zizyphus jujuba L.
743	Duclap.	" Lotus L.
744	Calamansanai.	Gimbernatia Calamansanai Bl.
745	Anilao.	Columbia anilao Bl.
746	Salago.	Wikstræmia indica Mey.
747	Molave.	Vitex altissima Roxb.
748	Lagundi.	" trifolia L. ?

UITS.

Aplications.	PRICE.
Amongst these, the Boboi is worthy of special notice, as it yields cotton of good quality for weaving and for mattresses &c. when used raw. Bonga (areca) so extensively used by the natives whith the betel in eastern countries. The fruits of the orange (narangita and cagel) the mango. the bread fruit (rima) the chico and the custard apple (ate) are generally found in all the principal markets.	The Boboi not beeng yet extensively cultivated, the trade made in the cotton it produces is of little importance and confined to a few parce's brought down to Manila from Cebù and Negros, either in ears, a made fn to pillows which are so'd at about $35 to $40 per 100.

Numbers	Tagalog Names.	Systematic Names.
749	Bancol.	Nauclea glaberrima Bart.
750	Duclitan.	Sideroxylon Duclitan Bl.
751	Balimbin.	Averrhoa Carambola L.
752	Camios.	" Bilimbi L.
753	Mamalis.	Limonia laureola D. C.
754	Chicos.	Achras Sapota L.
755	Sampa oc.	Tamarindus indica L.
756	Ulayan.	Quercus sp.
757	Achiote.	Bixa orellana L.
758	Hauili.	Ficus laurifolia L.
759	Putat.	Barringtonía racemosa Bl.
760	Cabigui or Tolosan.	Mimusops talusan Bl.
761	Cahoi-dalaga.	Mussœnda frondosa L.
762	Ba iti.	Ficus indica L.
763	Pandacaqui.	Tabernœmontana laurifolia L.
764	Calai.	Monodora myristica Dun.
765	Dalonot.	Urtica arborescens L.
766	Talisay.	Terminalia mauritiana L.
767	Alagao.	Premna odorata Bl.
768	Dalinhasai.	Fagara decandra Bl.
769	Calumpang.	Sterculia fœtida L.
770	Balabalayan.	Gmelina asiatica.
771	Aromo.	Mimosa Farnessiana L.
772	Paquiling.	Ficus scabra Jacq.
773	Café.	Coffea arabica L.
774	Ate.	Annona sqmamosa L.
775	Bayaquiboc.	Hypericum olympicum L.
776	Caragli or Calagri.	Remijia oscura.
777	Zapote.	Diospyros Sapota L.
778	Manga de pico.	Mangifera rostrata Bl.
779	Bonga.	Arecha Catechu L.

VII. SPECIMENS OF FIELD

Numbers	Tagalog Names.	Systematic Names.
780	Wild board.	Sus scrofa L.
781	Deer.	Cervus philippinus Smith.
782	Buffalo (a head ske'eton.)	Bos buhalus L.
783	Tamarao.	Anti.ope depressicornis Smith.
784	Pilandoc.	Moschus javanicus Gmelin.
785	Kaguan.	Galeopithecus philippinensis Waterhouse.
786	Wild cock.	Tetrao urogallus L.
787	Wild duck.	Anas boschas L.

Aplicatione.	PRICE.
	Coffee is exported in quantity, this reaching in 1874 2.854.270 kilo: The current price ranged from $20 to $25 per picul.

-SPORTS AND FISHERY.

OBSERVATIONS.

The Zoological species in this section, as the most remarkable in the Philippines, are generally very abundant: some are found only in special localities, as, for instance the Tamarao in Mindoro, the Pilandoc in Balabac, and the Caguan in Bohol.

Numbers	Tagalog Names.	Systematic Names.
788	Wild pigeons.	Columba, Carpophaga and other kinds.
789	Snipe.	?
790	Pogo.	Charadrius minor L.
791	Canugtun.	Platalea lencorodia Gmelin.
792	Ulug.	Gallinula cloropus L.
793	Pelican.	Pelecanus onocrotalus.
794	Garza parda.	Ardea purpurata L.
795	Suliasig.	?
796	Culiauan.	Oriolus chinensis Gmelin.
797	Maya.	Loxia oryzivora L.
798	Anade.	Anas philippensis L.
799	Catatua.	Psittacus nasicus Temm.
800	Matambayan.	?
801	Dalag.	Ophiocephalus vagus Peters
802	Eel.	?
803	Bamboan.	?
804	Candole.	?
805	Bia.	?
806	Langaray.	?
807	Apahap.	?
808	Gito.	?
809	Martinico.	?
810	Ayungin.	?
811	Lisa.	?
812	Quitan.	?
813	Bee's wax.	,,
814	Honey.	,,
815	Tapioca flour.	Jatropha Manihot L.
816	Arrow-root flour.	Maranta arundinacea Bl.
817	Sago ,,	Cycas circinalis L.
818	Gaogao ,,	Tacca palmata Bl.
819	Tigbi ,,	Coix lacrima Bl.

IX. MODELS OF SH

vegetable specimens of extraordinary

Model of a Bergantine built at the yard of Mr. Sabas Melliza (provineie of Cebu). Keelson, dungon; Stem and Apron, molave; Starn-post and Inner post Timbers and mangachapuy; Cabin's and Cook's house inner planking, mangasinoro; Cabinis bulk

OBSERVATIONS.

It	is	sold	in	Manila	at	$	0.50	per	lb.
,,	,,	,,	,,	,,	,,	,,	$0.63\frac{1}{2}$	,,	,,
,,	,,	,,	,,	,,	,,	,,	0.50	,,	,,
,,	,,	,,	,,	,,	,,	,,	,,	,,	,,

S AND VESSELS,

ensions; and wood cuttings tools.

y). The best materials have been employed in it, that is to say Keel and s of the same, Shelves; Deck's and lower hold's beams batitinan; Wales planking and doors narra.

Model of a Lorcha or cargo boat. This model has been built at the building
Model of Casco. Mostly used for inland navigation, made at the same yard.
Model of Banca or Baroto. Used by the natives for fishing and transporting
Mr. Patricio Bay'on (province of Albay).
Model of a Vilos. With bamboo and palm tree bows, used by the natives for
A plank of large dimensions cut out of the Tove tree.
A Disk of the same.
Bamboo (Bambus arundo L.) of remarkable size.
Rattan (Calamus maximun L.) of 180 varas (150 metres 46 centimetres) in
Stump of extraordinary dimentions of a palm tree vulgarly called Pugahan
Axes used in the country for felling trees.

yard of Mr. Blas Villaroya.

produce through rivers and creeks. Made at the building yard of coasting trade. This model made at the same yard.

leegth.
(Cayota urens L.)

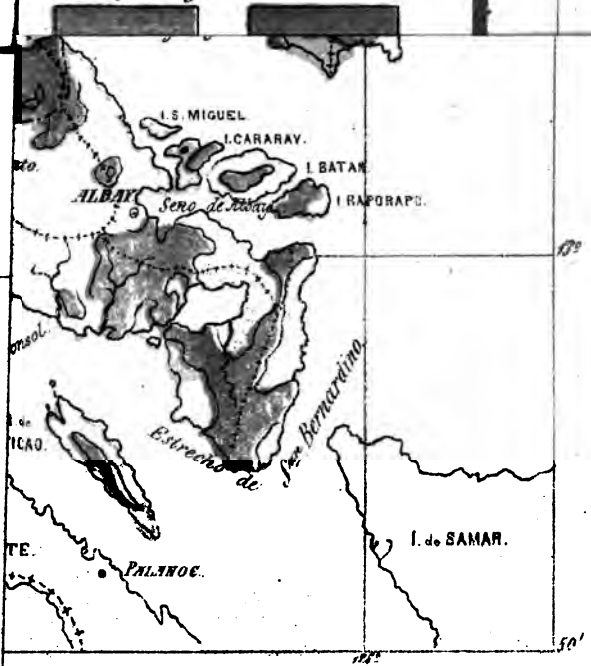
Sheet Nr 1.

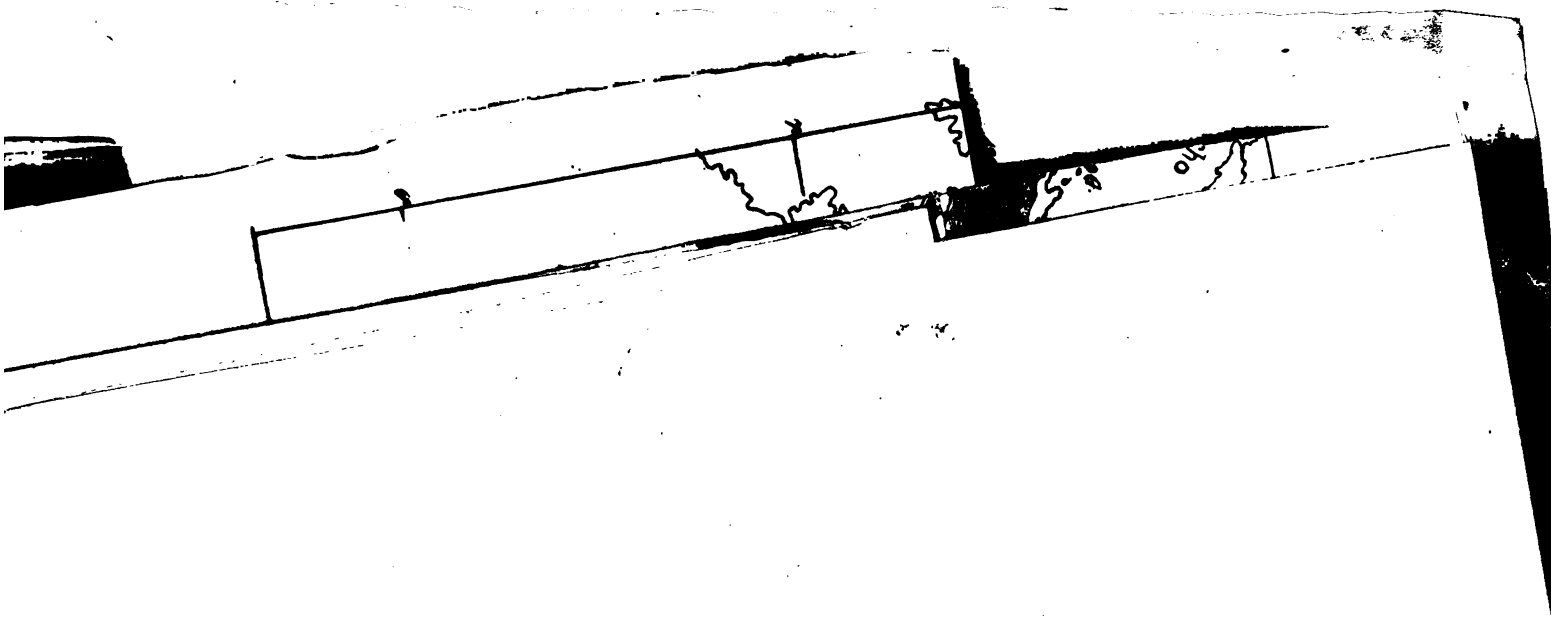
of the **FORESTS**

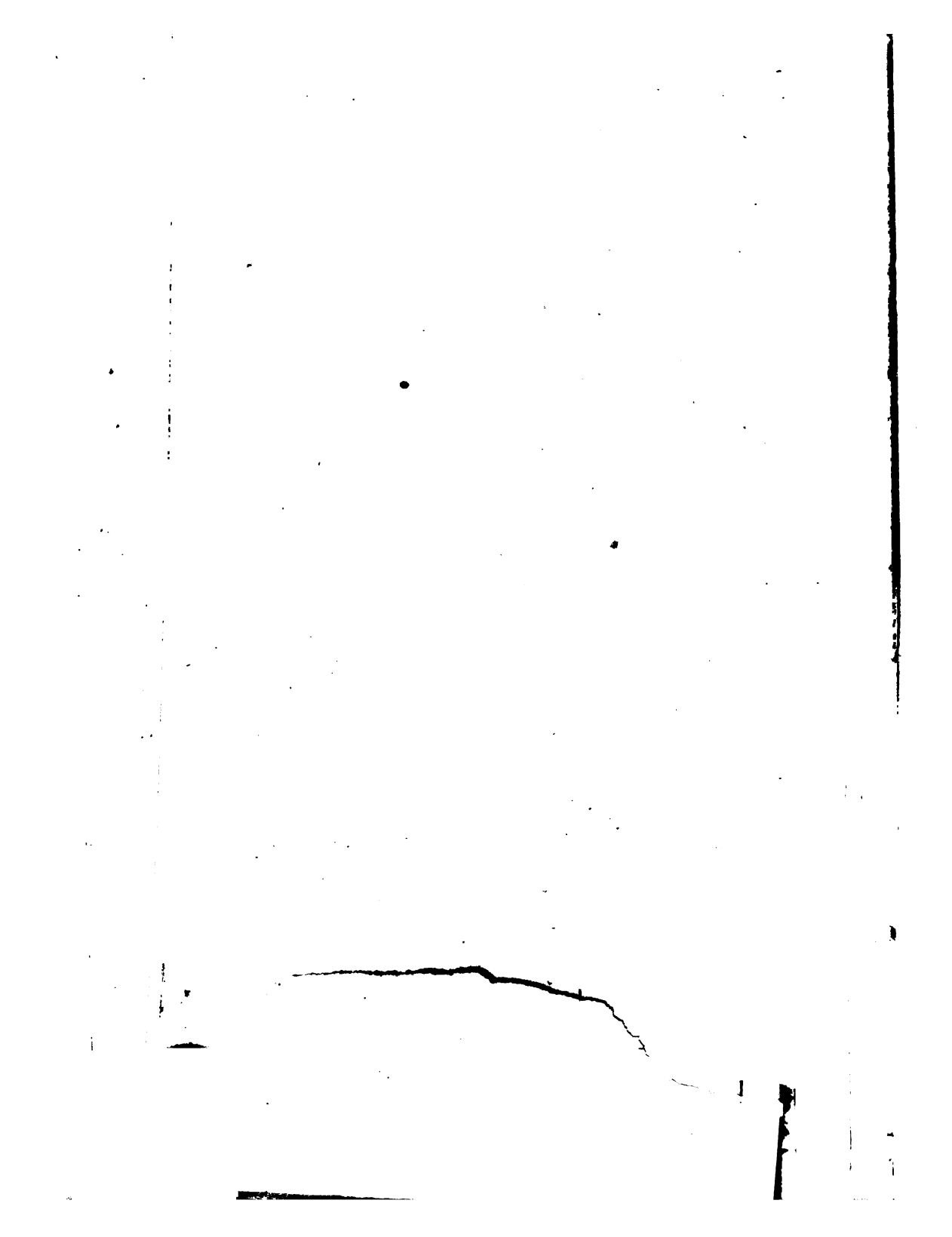
of the

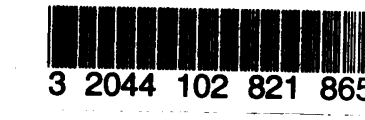
NE ARCHIPELACO.

natory Signs.





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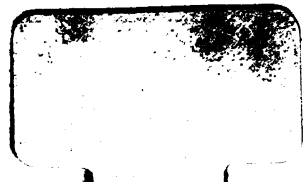

U HOLZER BINDER BOSTON MASS.